

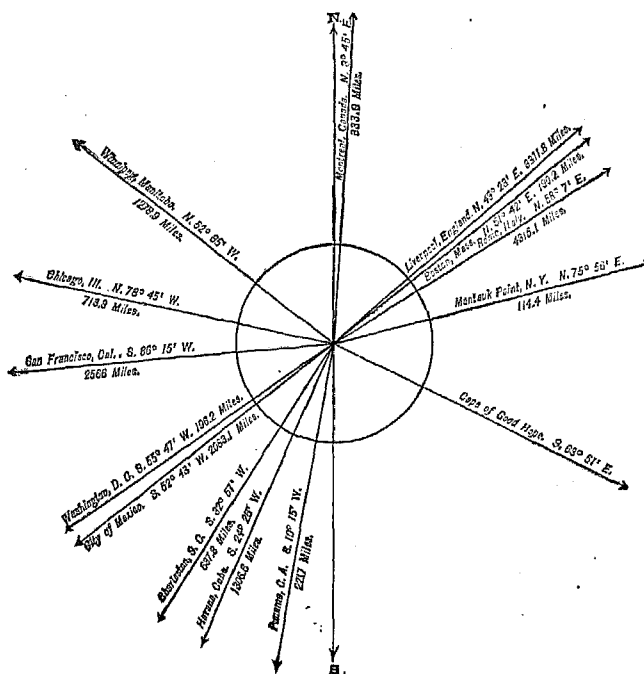
# THE METROPOLIS.

## POPULATION

IN THE  
AGGREGATE,

1790-1880.

	Inhab.
1790.....	34,734
1800.....	62,893
1810.....	100,775
1820.....	137,388
1830.....	220,471
1840.....	369,305
1850.....	660,803
1860.....	1,183,148
1870.....	1,546,293
1880.....	2,061,191



## POPULATION

BY  
SEX, NATIVITY, AND RACE,

AT

CENSUS OF 1880.

Male .....	1,004,012
Female .....	1,057,179
Native .....	1,312,244
Foreign-born .....	748,947
White .....	2,027,717
Colored .....	*33,474

\* Including 897 Chinese, 16 Japanese, and 78 Indians.

## THE CITIES INCLUDED ARE—

- (1) NEW YORK, NEW YORK.
- (2) BROOKLYN, NEW YORK.
- (3) JERSEY CITY, NEW JERSEY.
- (4) NEWARK, NEW JERSEY.
- (5) HOBOKEN, NEW JERSEY.

# THE METROPOLIS.

It seems proper, in treating of the vast population occupying the cities of New York, Brooklyn, Jersey City, Newark, and Hoboken, to consider them not only as constituting five different municipalities, but as one great metropolitan community. This population has grown from one nucleus—the little trading-post at the Battery—and its separation into different civil divisions is by physical and political lines, which have had little influence on the character of the people, their industries, or their modes of life. The relation between these cities is in a great degree the same, though more strongly marked by physical divisions, such as the Hudson river and the Hackensack meadows, as that which existed up to 1856 between the city of Philadelphia, then bounded by the two rivers and

by Vine street on the north, and by Pine street on the south, and its adjacent districts—West Philadelphia, Spring Garden, Kensington, Germantown, etc.—which had then each its own distinct local government, and all of which are now united in name and in municipal control, as they formerly were in interest and in mutual interdependence. It is true that this mode of reasoning might easily be carried to the extreme of absurdity. There is no controlling reason why Flushing, New Rochelle, Yonkers, and Paterson might not to be included in the same community. Indeed, the villages and towns strung along the railways for 50 miles from New York are very largely made up of persons doing business in the city, or occupied in manufactures which there find their market. Wherever the line may be drawn it must be an arbitrary one, and it has been thought most proper to include only those larger towns which are most intimately allied with New York as their commercial center, and, as it happens, which transport their raw material and their products from and to it largely by wagons.

To adopt the opposite course, considering New York as New York, Brooklyn as Brooklyn, and Newark as Newark, would be misleading to one who might read the report of each particular city by itself. There is no reason to suppose that the western end of Long Island would have become the site of a great city had it depended on its own natural advantages alone; neither that Newark would have become a great manufacturing town had it not been for the distributing facilities of New York. It would be more than just to either of these to credit it with its present prosperity without reference to New York, and certainly much less than just to New York to limit its population, its industries, and its achievements to what we now find on Manhattan island. Therefore, while these different cities are described independently and without reference to their relations with each other, it seems best to bring them together into one group, and to consolidate the statistical information concerning them under the one head of "The Metropolis" which they constitute.

Metropolitan London is separated into the City of London proper—that small district east of Temple Bar, where the lord mayor and the aldermen reign supreme—and a great number of parishes still governed in their local affairs by their church vestries. Save that its separation is by an invisible line, and that both are under the control of certain metropolitan boards established by act of parliament, Westminster is hardly more a part of London than Brooklyn is a part of New York.

Paris is extending beyond its fortifications, and is bringing under its wing the villages of its *banlieue*.

In comparing the population and importance of the great cities of the world, it is proper that each great metropolis should be credited with the natural outgrowth of the original nucleus—the Metropolis of the United States as well as those of England, France, and Germany.

#### POPULATION AND OCCUPATION.

There are 171,457 dwellings in the Metropolis, with an average of 12.02 persons to a dwelling, and 417,293 families, with an average of 4.98 persons to a family, the average number of families to a dwelling being 2.43.

#### MANUFACTURES.

The following is a summary of the statistics of manufactures for the Metropolis, taken from tables prepared for the Tenth Census:

Mechanical and manufacturing industries.	Capital employed.	AVERAGE NUMBER OF HANDS EMPLOYED.				Total amount paid in wages during the year.	Value of materials.	Value of products.
		Males above 16 years.	Females above 15 years.	Children and youths.	Total.			
All industries, 18,504 in number .....	\$280,019,225 00	214,016	86,546	16,290	316,846	\$137,595,166 00	\$512,458,858 00	\$780,927,325 00
The largest industry .....	15,776,000 00	3,288	.....	18	3,306	1,684,028 00	87,861,575 00	93,841,665 00
The smallest industry .....	2,300 00	10	.....	1	11	7,608 00	4,125 00	13,719 00
Average of all .....	15,132 47	11.5	4.6	0.9	17	7,411 93	27,604 98	42,066 75

From the foregoing table it appears that the average capital of all establishments is \$15,132 47; that the average wages of all hands employed is \$434 27 per annum; that the average outlay in wages, in materials, and in interest (at 6 per cent.) on capital employed is \$35,924 86; and that the average profit from all establishments (not deducting incidental expenses and power) is \$6,141 89, being 40.5 per cent. on the average capital employed.

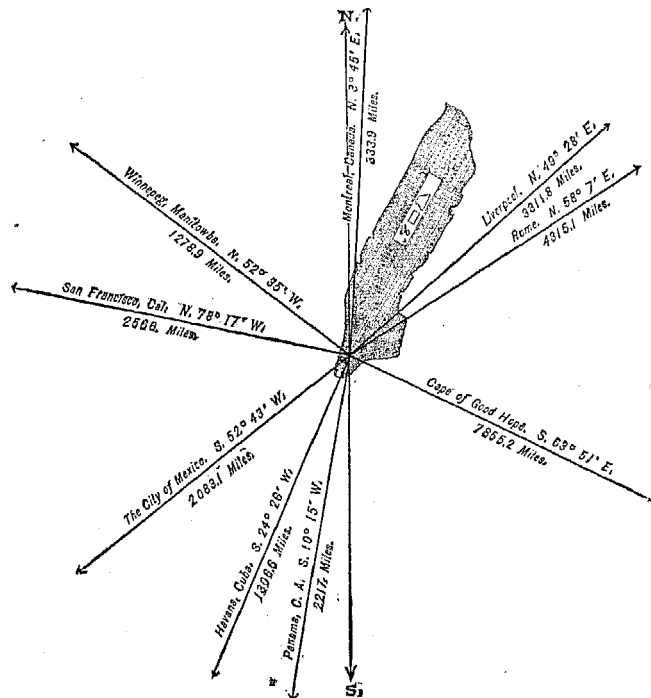
There is one industrial establishment to each 111 of the population. The wages paid equals \$66 76 per annum to each inhabitant; the value of products equals \$378 87 per annum to each inhabitant, and the profit on all industries equals \$55 32 per annum to each inhabitant.

# NEW YORK CITY.

## POPULATION

IN THE  
AGGREGATE,  
1790-1880.

	Inhab.
1790.....	33,131
1800.....	60,515
1810.....	96,373
1820.....	123,706
1830.....	197,112
1840.....	312,710
1850.....	515,547
1860.....	805,658
1870.....	942,292
1880.....	1,206,299



## POPULATION

BY  
SEX, NATIVITY, AND RACE,  
AT  
CENSUS OF 1880.

Male.....	590,514
Female.....	615,785
Native.....	727,629
Foreign-born.....	478,670
White.....	1,185,843
Colored.....	*20,456

\* Including 731 Chinese, 16 Japanese, and 46 Indians.

Latitude: 40° 42' North; Longitude: 74° (west from Greenwich); Altitude: 0 to 282 feet.

## FINANCIAL CONDITION:

Total Valuation: \$1,094,069,335; per capita: \$907 00. Net Indebtedness: \$109,425,414; per capita: \$90 71. Tax per \$100: \$2 58.

## HISTORICAL SKETCH.

BY MRS. MARTHA J. LAMB.

## ORIGIN AND SETTLEMENT.

Nature never prepared a more picturesque or a more advantageous site for a great commercial capital than Manhattan island, nor a harbor more secure or better adapted for the commerce of the world than New York bay. In primeval solitude, 3,000 miles from civilization, the discovery and settlement of the island by Europeans may be traced to causes beginning about three centuries ago. Two great Dutch commercial corporations seriously agitated the world during the half-century between 1580 and 1630, and in the convulsive movements through which they took their rise New York had its origin.

The Dutch, without being a creative people, were forced into a commercial enterprise of vast magnitude by the action of Philip II in uniting Portugal to Spain, and beginning war upon England. Until then Lisbon had long been the European depot for the products of the Orient. England, with her ships excluded from Spanish ports, at once began to buy her spices, silks, and other Indian goods from the Dutch. Presently the revolt of the Netherlands excluded Dutch vessels also from the ports of Spain and Portugal. Already reaping large profits from English trade, the Dutch merchants were not to be baffled in the matter of obtaining supplies. Prices had advanced on all India goods—on pepper, for instance, 200 per cent.—and they conceived a resolute idea of opening an avenue to China and the East Indies for themselves. Thus originated the great Dutch East India Company, whose vessels followed in the track of the Portuguese around Africa. Its directors were chiefly nobles of the old school, and its material prosperity was simply marvelous. Within the first twenty years of its existence it divided upward of four times its original capital among its shareholders, and accumulated immense possessions in colonies and vessels. It was not indifferent to the efforts of the period to find a shorter route to India “across the north pole”, and finally an expedition was fitted out with this object in view, giving the command to the English navigator, Henry Hudson. He sailed toward the icebergs until further progress in that direction was impossible, and then steered his ship for the American coast. He was familiar with the charts and reports of Verazzano, the Florentine navigator, who is believed to have entered New York bay in 1524, while in the French service, and with careful precision furrowed the same waters and anchored the “Half Moon” in front of Manhattan island, September 11, 1609. The prospect charmed him, and the broad and seemingly immeasurable North river appeared in his eyes the probable passage to Cathay. He explored its waters until navigation became obstructed (near Albany), and kept a circumstantial record of his observations on the voyage. But the East India company had not sent him to America, and cared little for his discoveries. No steps were taken to possess the new country or to profit by its possibilities. Its attractions were nothing in comparison with Eastern commerce.

Meanwhile the forces were in motion that, a decade later, resulted in the formation of the famous Dutch West India Company. This gigantic scheme was openly and persistently opposed by the East India company from the time of its inception until it became a fixed fact—nearly thirty years. Its actual existence as a power dates from 1606. Its final organization and recognition by the Dutch government bears date June 21, 1623. In the interim it had been used as a threat to intimidate Spain, and chiefly through its influence the twelve years’ truce was accomplished in 1609 that played so important a part in the history of the Netherlands. Its struggles to become a corporate body were unsuccessful until after the great statesman, John of Barneveld, was led to the scaffold, in 1618, and beheaded. Its purpose to combat and worry Spain, ruin her settlements, seize her transports, and win its recompense from the spoils, provoked neither the sympathy of the government nor the approval of public sentiment. The special clause in its constitution, which in the end became the turning and life-giving point in its career, was its pledge to colonize “New Netherland”, the so-called Dutch possessions in North America. England claimed the territory, and the states-general, embarrassed by the situation, saw no way to hold it but by absolute possession. Thus the new company was suddenly regarded with favor, and the Belgian party, so long in the minority, acquired the strength through which it was not only instrumental in saving Holland from the Spanish yoke, but brought to New York the nation in which the vital principle of human liberty was securely planted.

Mercantile enterprise had already been aroused in Holland by the discoveries of Hudson. Dutch vessels visited Manhattan island to buy furs of the Indians as early as 1610 and 1611. In 1613 four small habitations were erected near the Battery to shelter until spring some traders whose ship was burned. In 1614 a trading charter for three years was granted to some Dutch associated merchants by the states-general, in which the name “New Netherland” was first given to what is now New York. But no political powers were granted, no purchase of land effected, no attempt at colonization made. Indeed, nothing further was contemplated than private traffic with the natives.

The first trading fort was built on Manhattan island in 1615, and another about the same time was established near the present site of Albany. When the trading charter expired in 1617 the states-general declined to renew it, and traders were henceforward licensed only from year to year.

The unfolding West India company was about to be guaranteed the exclusive trade of the American and African shores of the Atlantic, precisely as the East India company had been granted the right to send ships to Asia, to the exclusion of the other inhabitants of the Dutch provinces. The West India company, like the East India company, was also divided into five chambers, each constituting a separate society, with members, directors, and vessels of its own. The capital reached \$2,500,000. The general affairs of the company were conducted by 19 representative directors, styled the “College of the XIX”. Shareholders were accorded a voice in all important proceedings, which was a constant reproach to the aristocratic East India company, and created no little disturbance.

Probably no other private corporation was ever invested with such enormous powers. It was almost a distinct and separate government. Its fleets frequently numbered as many as 70 armed vessels each. Within a month after its incorporation armed expeditions were sent to the West Indies and to Brazil. Prizes were in a few months captured of such value that shareholders received from 25 to 75 per cent. on their investments. Little care was bestowed upon the germ of New York further than to satisfy the states-general that it would ultimately be peopled according to contract. The indefinite territory was erected into a province during the year 1624, and 30 Walloon families were encouraged to emigrate and begin settlements; but of this party only 8 men remained on Manhattan island, the others proceeding up the Hudson.



Thus matters stood until 1625, when the treaty of alliance between England and the Netherlands for the destruction of Spanish commerce gave the Dutch reason to believe that New Netherland might be improved and settled without danger of English interference. A meeting of the Dutch West India company, under whose control were the American possessions, was one of the first-fruits of this new relationship, the object being to discuss plans for inducing emigration, and to decide upon a system of government for the infant province. The first governor chosen was Peter Minuet, a man of great personal courage, thoroughly imbued with the spirit of adventure, one who had some East Indian as well as South American experience, and who possessed the tact and good sense needful for preserving peace with the savage landholders. He arrived at Manhattan island May 4, 1626. His first act was to assemble the natives and trade with them for their domain. He purchased the entire island of Manhattan with a few beads, buttons, and other trinkets, estimated in value at \$24 of our currency. He then organized the government. The supreme authority, executive, legislative, and judicial, had been vested in him by the corporation. According to his instructions he chose an advisory council of five of the best men in the colony. He built a fort, a warehouse of Manhattan stone, a horse-mill, with a loft appropriated for religious worship, and about 30 small houses. Other ships arrived with settlers, and the population soon numbered 200. Patches of cleared land about the fort bore crops of grain the first year. The chief business of the inhabitants was trading gewgaws for beaver, wildcat, otter, and muskrat skins, which the Indians were constantly bringing to market. Every homeward-bound Holland ship carried a cargo of these furs. But in comparison with the capture of Spanish vessels laden with gold and silver—of which the company recorded 104 between 1626 and 1628—the American fur traffic was exceedingly unprofitable. Indeed, the colony of New Netherland was not even self-supporting.

#### FEUDAL ESTATES, GROWTH, AND SOCIAL ORDER.

To remedy matters through the purses of private capitalists, an ingenious scheme was devised, which received the sanction of the states-general in 1629. It was called the "charter of freedoms and exemptions". It conferred the title of patroon upon any member of the company who would buy of the Indians a tract of land in New Netherland bordering a navigable river—16 miles on one side or 8 miles on both sides—which might extend inland indefinitely, and found thereon a colony of 50 adults. The people under these feudal chieftains were promised ten years' exemption from taxes, but were bound to the patroon in almost absolute servitude. Manufactures were prohibited, as well as the right to trade with the Indians for furs, which business, whether lucrative or otherwise, the company reserved to itself. Protection against all enemies was guaranteed to the colonists. A supply of negro servants was pledged, and a suitable citadel was to be constructed on Manhattan island, which had already become by actual purchase the special property of the company.

No sooner did the scheme become a law than a few of the directors hastened to secure to themselves immense tracts of land in the choicest localities. Of these, one of the most important was Kiliaen Van Rensselaer, one of the original founders of the company, who sent out three vessels during the year, and purchased of the savages from time to time in several parcels a tract on the Hudson river 24 by 48 miles in extent, comprising the principal portion of the present counties of Albany, Rensselaer, and Columbia, and this great estate was called Rensselaerswick. Van Rensselaer sent over his own ships with settlers and their families, and he furnished all the stores and implements of husbandry needful. His colony speedily assumed a prosperous condition. But Manhattan island languished. A quarrel among the officers and members of the company in Holland prevented improvements of any kind. The newly-constituted patroonships were the source of the disturbance, and for three years the population diminished rather than increased. Governor Minuet was suspected and accused of aiding the patroons in conducting private trade with the Indians independently of the corporation, and was summarily recalled.

The second governor of New Netherland was Wouter Van Twiller, a relative of Van Rensselaer. The company had triumphed in the contest, an appeal having been made to the states-general, who decided against the patroons. But Van Rensselaer's influence among the directors is apparent from their choice of an executive officer. Van Twiller had previously been in New Netherland twice, in the interests of trade, and was supposed to understand its affairs. But while notably shrewd in all business transactions, he had little capacity for government. He arrived in the spring of 1633, attended by 104 soldiers, the first military force on Manhattan island. In the same vessel came Dominie Everdus Bogardus, the pioneer clergyman, whose name has been handed down by his descendants in New York to the present time. The advent of the first school-master, Adam Roelandsen, was of the same date. Among the earliest improvements chronicled was the erection of three costly wind-mills, a guard-house and barracks inside the fort, a plain wooden church, a few brick and frame dwellings, and one or two small breweries. Farms were also laid out and tobacco-patches cultivated. The little town was called New Amsterdam.

But the directors and the patroons were not at peace, and no independent farmers attempted the cultivation of the soil. The quarrel broke out with renewed violence, the patroons persisting in their right to the fur traffic through their interpretation of the charter, in which they claimed to be "privileged" instead of "private" persons. Able lawyers were employed on either side, and both parties again appealed to the states-general for redress of grievances. But the tangle was too knotty, and their high mightinesses prudently postponed decision. Meanwhile Governor Van Twiller, in his ambitious desire to serve the company, planted several small colonies in the regions

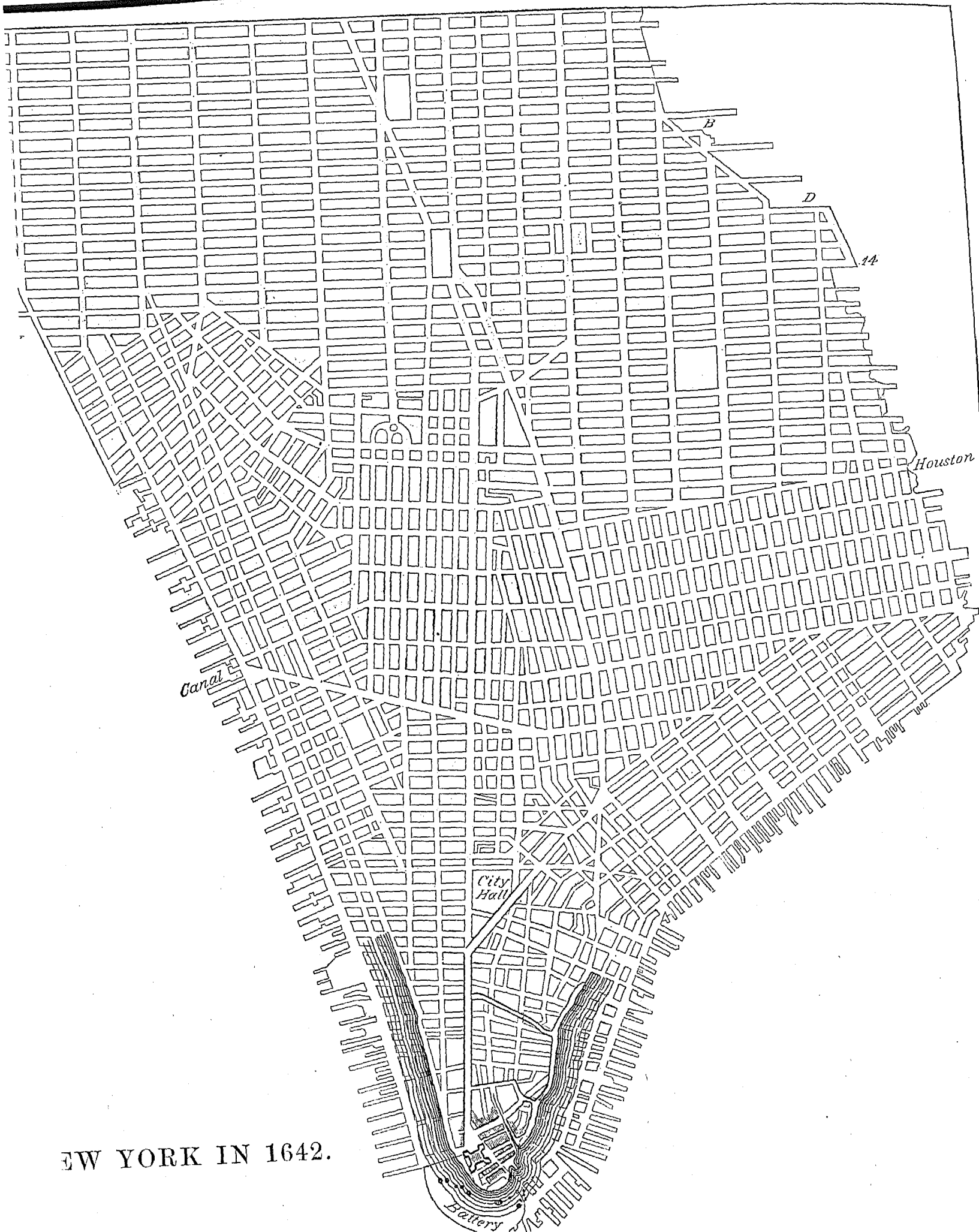
surrounding Manhattan island, but he incurred the lasting enmity of the patroons. He was charged with general incapacity for ruling the colony, and with all manner of irregular proceedings. His employers could do no less than employ a new governor in his stead.

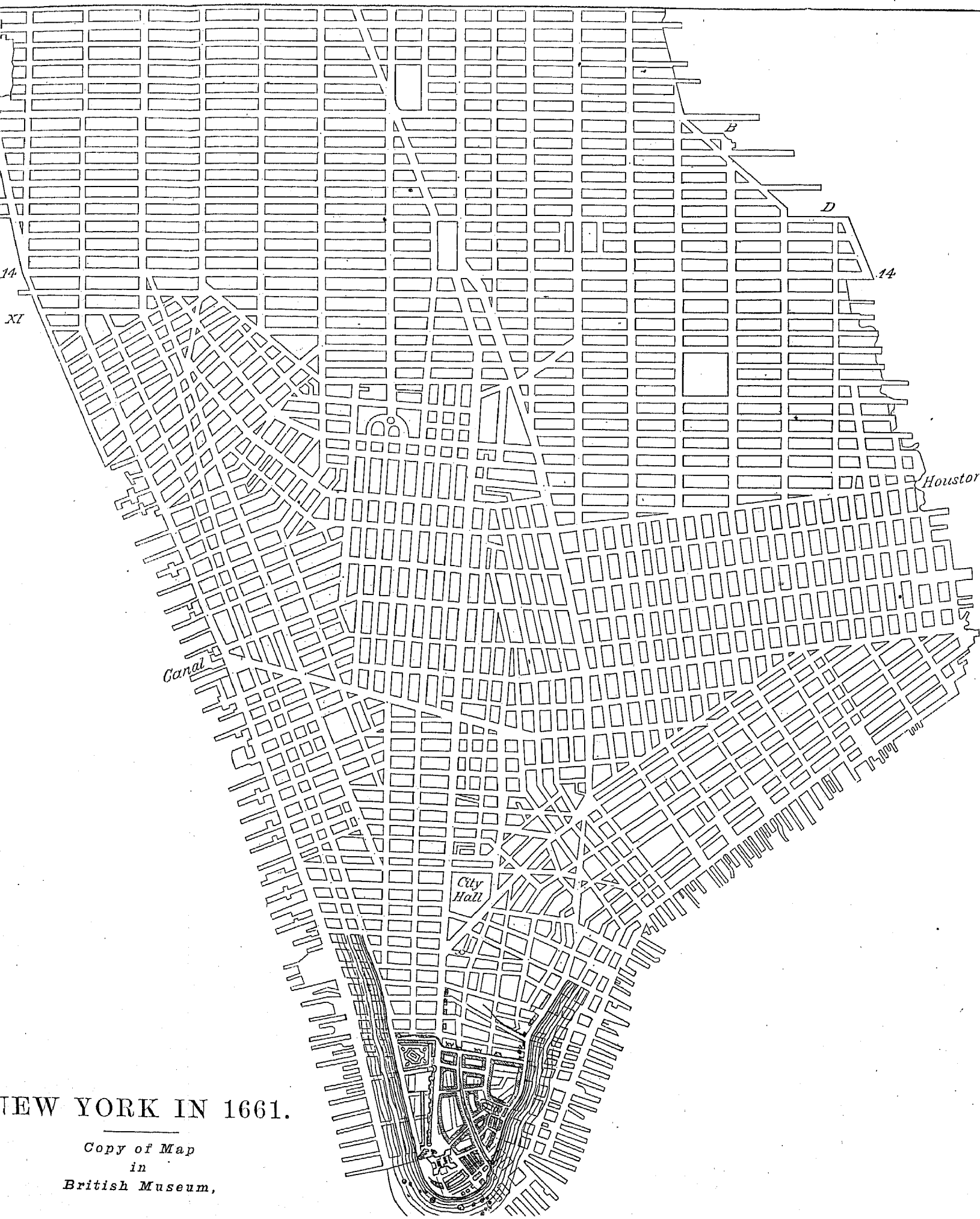
The third Dutch governor was William Kieft, who reached Manhattan island in March, 1638. The succeeding eight years was a period of constant turbulence and trouble with the colonists, with the savages, and with the English settlers on Long island and in Connecticut. Governor Kieft was unpopular from the beginning. He was a small, bustling, fiery-tempered man, of industrious and temperate habits and exceptional morality, but conceited and headstrong, arbitrary and indiscreet. He consulted no one. He was aware of the waning interest of the company in their New Netherland property before leaving Holland; the expediency of turning the district over to the states-general was under discussion, and he thus assumed arbitrary power with the more confidence. His instructions were so worded that he might fix the number of his privy counselors, and he cautiously chose but *one man*, who should be entitled to but *one* vote, while he reserved to himself two votes. Such a high-handed act of despotism would not have been tolerated for a day in any part of the Dutch republic, and it simply illustrates the abuses attending a vast commercial monopoly. The one counselor, Dr. Johannes La Montagne, was a Frenchman who had escaped from the rage of religious persecution in his own country, and who might have been under other circumstances an arm of strength to the governor, for he was a versatile scholar in politics and law as well as in medicine. Reformatory work began with the administration, and proclamations in great variety were issued. Little progress, however, could be made in a colony shaken by internal jealousies and threatened with outside aggressions. The contentions in Holland between the patroons and the directors resulted in a new charter of freedoms and exemptions in 1640, which amended in some particulars the obnoxious instrument of 1629. Landed estates were now limited to one mile along a bay or river and two miles inland, and manufactures were allowed. But disputes were to be settled by the governor under all circumstances, and thus he continued to hold supreme command.

Numerous vessels bringing settlers reached the country, but the imprudences of the governor in his treatment of the Indians precipitated a bloody war. Nearly every plantation within a radius of 100 miles from New Amsterdam was destroyed by the savages. Whole families were tomahawked and scalped, while others fled to the fort for shelter and protection. Kieft made a feeble show of concession to popular rights by summoning "twelve men" into council, the first representative body in the colony. Their honest verdict censuring the war displeased him, and when they issued a "memorial" foreshadowing the determination to restrain his domineering arrogance, he disbanded them without ceremony. Five years of terror and of blood followed. Meanwhile the patroon colony of Rensselaerswick prospered and extended, surrounded by friendly savages. On one occasion the cargo of a ship belonging to Van Rensselaer was confiscated by Kieft, and the shoes thus obtained were worn by a party of soldiers into the woods, to destroy an Indian village. Spirited appeals for assistance were sent across the ocean by the leading colonists, the few surviving inhabitants of Manhattan island being in terrible distress, beyond description, and they must surely perish without relief. The governor, in alarm, proclaimed a day of fasting and prayer. The financial condition of the West India company was by this time approaching bankruptcy, and help came slowly. "Eight men", who had been chosen by the voice of the people, finally addressed a cutting memorial to the once "proud company", charging the whole blame of the disastrous war upon Kieft, and demanding his recall. This paper was accompanied by the serious threat of abandoning Manhattan island altogether. It wrought the desired change—Kieft was recalled. But the process of adjusting the difficulties of the situation occupied many months, and, in the mean time a treaty of peace with the Indians was negotiated, and people began once more to scatter over the country and to improve the land.

The fourth Dutch governor was Petrus Stuyvesant, who ruled the colony 17 years with great ability. He received his appointment and took the oath of office before the states-general July 28, 1646. He sailed on Christmas morning, reaching Manhattan island May 11, 1647. He was a man of honest impulses and exceptional force of character, and his administration was characterized by a course of conduct which in vigor, dignity, and symmetry stands out in strong contrast with the capricious despotism of his predecessor. The very conditions of his office compelled him to assume individual responsibility, and rely upon his own private judgment in the majority of instances, for the machinery of government was insufficient of itself to control a mixed community whose interests were in perpetual conflict with those of the mercantile company holding the reins of power. He found dilapidation and discomfort on all sides, and chaos in every department of the public service. His heart warmed toward the new country, and his whole soul became subsequently enlisted in its welfare. He repaired the fort, completed the half-built church within its limits, established a court of justice, and attempted to collect the public revenue (long in arrears), and to settle conflicting claims with the patroons. He encountered a series of trials which tested his temper and discretion to the utmost. In the midst of his serious perplexities he called a public meeting and caused "nine men" to be chosen to advise and assist in the affairs of the government. In a few months he was in a fiery controversy with the "popular tribune", and both parties complained to the authorities in Holland. One of Governor Stuyvesant's earliest acts of importance related to the observance of the sabbath, which in his opinion, as a means of social, moral, and physical health, and as a measure of industrial economy, came directly within the scope of legislation. His example of devout sabbath worship was strictly followed, and the day was marked by an entire

NEW YORK IN 1642.





NEW YORK IN 1661.

Copy of Map  
in  
British Museum,

cessation from worldly labor. The little town was incorporated into a city February 2, 1653, with 2 burgomasters and 5 schepens. The meetings of these first city fathers were opened with a solemn and impressive form of prayer, and on Sunday mornings they walked in procession, preceded by the bell-ringer, carrying their cushions of state to the church in the fort, where a prominent pew was set apart for their occupancy.

The outbreak of hostilities between the English and the Dutch in Europe added greatly to the governor's duties and responsibilities in New York, with uneasy New England on one side and Virginia on the other. War among the colonies was seriously apprehended. Rumors reached Stuyvesant that his feeble Dutch colony was about to be attacked by the English of Massachusetts and Connecticut, and he hastened to fortify the city. The present line of Wall street was the extreme city limit, and across the island at that point a ditch and palisades with a breastwork were speedily constructed, every man being required to leave his business and lend a helping hand. About 40 of the principal citizens subscribed a loan of \$2,000 to defray expenses. In the mean time a snarl of disputes about the boundary line of the province, about the feudal powers within the province, and about the control of the city government, kept the active governor in a sea of tribulation. He received orders from Holland to drive the Swedes from the South river, and during his absence on that mission the Indians became hostile, entering the quiet city on Manhattan island 2,000 strong. They were driven to their canoes, but hurried to Staten island and the Jersey shore and massacred every man, woman, and child they could find. Within three days property was destroyed to the amount of \$80,000, and the whole country was stricken with terror. The return of the governor brought peace, for his policy in treating with the savages was of a resolute character, yet so gentle and conciliating on the other hand as to win their confidence and friendship.

The census of the city was taken in 1656. Its inhabitants then numbered 1,000, of whom a considerable proportion were negro slaves. The city contained at that date about 120 houses, some of which rented at \$14, and some as high as \$100 per annum. The average price of the best city lots was \$50, all buyers of lots being compelled by the terms of purchase to build upon them without delay. During the year 17 streets were surveyed and established. The next year (1657) one short street was paved with cobble-stones, the gutter being left in the middle. In 1658 a second street was improved in like manner. Prior to 1660 all the streets most used were paved, but there were no sidewalks.

The effort to sustain a good public school appears upon nearly every page of the early Dutch records. The system was immature and change of teachers frequent, but the early settlers of New York evinced a fixed determination to secure to their children the blessings of education. Harnen Van Hoboken taught the public school some five years about this period. He was a famous singer and acted as church chorister. He was superseded by Evert Pietersen because of alleged inattention to his pupils. The salary was then \$14 50 per month, with an allowance of \$50 per annum for board. As time wore on the pressure for a higher grade of schools was such that the city corporation petitioned the West India company for a master to be sent out from Holland to conduct a Latin school. They claimed that their sons had to be sent to New England for classical instruction, and agreed to build a school-house if the company would pay the teacher's salary. This request was granted, and an educator of considerable note was soon installed over a high school of 20 pupils, including 2 from Albany and 1 from Virginia. At the same time the public school was continued and two private schools for small children were supported.

Between the years 1660 and 1664 the city expanded in various directions. Houses, stores, breweries, and brick-kilns sprang into existence, and business of all kinds became active. But the company which had founded the settlement was in humiliating financial embarrassment. The province had cost beyond its receipts some 10 tons of gold, and a new danger threatened in the complications arising from the boundary disputes between New England and New Netherland. Presently the English questioned the right of the Dutch to any portion of the territory. Stuyvesant was perplexed with the treatment he received in Boston while endeavoring to adjust the controversy about the dividing-line, at the same time that the New England authorities were predicting with tolerable accuracy the final action of the English government in the premises. Charles II and his ministers were maturing a plan by which New Netherland was to be seized and appropriated. The Dutch province was first granted to the duke of York, as a preliminary measure, under the great seal of the king. An expedition was then secretly fitted out, and Colonel Richard Nicolls was placed in command, who was also commissioned governor of the unconquered dominion. The fleet sailed from Portsmouth about the middle of May, 1664. Before the end of August English banners floated over the waters of New York harbor, and a formal summons reached the governor to surrender the province of New Netherland, with all its towns, forts, etc., Nicolls promising to confirm every man in his own estate and liberty who should submit peaceably to the king's authority. It was a trying ordeal for the proud Stuyvesant, but he could hardly muster 400 men to bear arms, and he had not over 600 pounds of powder in the fort. As for the wall across the city from river to river, on the line of the present Wall street, however strong a defense against the Indians, it would avail nothing in the face of a civilized foe; and there was the exposure of the rivers. The English inhabitants were numerous, and were jubilant over the arrival of the king's forces. The citizens of other nationalities were terror-stricken, and besought the governor verbally and in writing to spare them the bloodshed and the suffering of a battle. It was anguish to the stern military chieftain. He hesitated, but was convinced in the end that it would be the mere murderous question of a few moments to attempt to hold the fort, and capitulated in unspeakable sorrow. A meeting was appointed for the following morning—Saturday—at Stuyvesant's

country-seat, and 24 articles of capitulation were carefully and intelligently discussed by the commissioners chosen, who were, on the part of Colonel Nicolls, Sir Thomas Carr, Sir George Carteret, Governor Winthrop of Boston, ex-Governor Willys of Connecticut, and John Pinchon and Thomas Clarke of Boston; and on the part of Governor Stuyvesant, Dominie Megapolensis, Cornelis Steenwyck, Oloff S. Van Cortlandt, Jacques Coussean, John De Decker, and Nicholas Varlett.

On Sunday afternoon, after the second sermon in the church in the fort, the terms on which New Netherland was surrendered were explained to the anxious community. The Dutch citizens were guaranteed security in their property, customs, conscience, and religion; intercourse with Holland was to continue, public buildings and public records were to be respected, and all civil officers were to remain in power until the customary time for a new election. These terms were probably the most favorable ever granted by a conqueror. The articles were to be signed on Monday morning by both parties, and within two hours afterward the fort was to be vacated, the soldiers marching out with all the honors of war.

The scene of this memorable day—September 8—was one of intense interest to all concerned. The city magistrates assembled in the council chamber and the people filled the streets. The Dutch garrison, bearing their arms and colors, marched with beat of drum to the wharf, where they embarked on a vessel bound for Holland. The English soldiers entered the town as the Dutch garrison departed. The city magistrates proclaimed Nicolls governor of the province, the English flag quickly floated over the fort, and the name of both province and city became New York.

#### UNDER ENGLISH RULE.

It was a mixed people, speaking many languages, which welcomed the new order of government. The Dutch were largely in the majority, but English life had also taken root, and French industry, vivacity, and refinement were firmly planted in the community. Indeed, all the chief nationalities of Europe were represented in the infant city. Eighteen languages were spoken in its streets. The irrepressible forces, political, social, and religious, which were sweeping over Europe in that remarkable century were already here, pushing to unforeseen ends. The Huguenots who found their Canaan in New York were generally of the cultured and wealthy classes; the public documents of the period were written in French as well as in the Dutch language. And now a new element of English vigor and will-power was introduced, and we shall find these inhabitants, drawn together from regions so remote, growing to be one people—fearless, thoughtful, constructive, politically alive, religiously free; a people who would dare to reject hereditary leaders, and who would fetter with careful limitations those whom it elected to places of trust.

The duke of York had chosen a resolute and honest governor for his new territory, which he had been told would, if well managed, yield him some £30,000 per annum. Nicolls was the son of a lawyer of the Middle Temple, well educated, and familiar with the literature and languages both of Holland and of France. He was some forty years of age, a little above the medium height, of fine, stately presence, with a fair, open face, a pleasant, magnetic, gray eye, somewhat deeply set, and hair slightly curled at the ends. He won the heart of the majority of the citizens in the beginning. The city fathers transacted their business as usual, and on the Sunday following the surrender the English Episcopal service was celebrated (for the first time in New York) by the chaplain of the English garrison, in the Dutch church in the fort, immediately after the close of the usual morning service.

Nicolls, however, found serious work on all sides. He was anxious to persuade the Dutch property-holders to remain in the country, and addressed them on the subject, at a public meeting in the common-council chambers, so successfully that in five days upward of 250 Dutch residents came forward and took the oath of allegiance to Charles II and the duke of York, among whom was ex-Governor Stuyvesant himself, Van Courtlandt, Van Rensselaer, Van Ruyven, Van Brugh, William Beekman, and the two Dutch ministers, Megapolensis and Drisius. He made peace with the settlements on the Hudson, and gave to Albany its name. He sent a large force to reduce the Swedish and Dutch settlements on the Delaware, and secured a bloodless victory. He stretched out his arm and gathered in Long island, calling it Yorkshire. In the mean time, Connecticut was in deep distress under a complication of patents. That from Charles II, obtained through the tact and diplomacy of the younger John Winthrop in 1662, extended her territory to the Pacific ocean; and here was another patent from Charles II to his brother, defining New York as embracing every foot of land west of the Connecticut river. Hartford and republican New Haven were both included in the extraordinary patent to the duke of York. The general court of Connecticut held a mournful meeting, and resolved "to make an effort to conciliate the royal commissioners", voting a present of 500 bushels of corn and some 5 horses. A committee was sent with the gift to New York, and the delicate and perplexing question of the two conflicting patents from the same monarch was discussed. It was clear to the mind of Nicolls that the thriving Connecticut colonies would be ruined unless concessions were made, and it was finally agreed to run the dividing-line between New York and Connecticut about 20 miles east from any part of the Hudson river. The Connecticut gentlemen inserted a clause in the document defining the starting-point and compass direction, by which the line was laid northerly from the mouth of Mamaroneck creek, and, ignorant of the geography of the region, Nicolls and his colleagues supposed the distance was 20 miles, when it was in reality only 10 miles from the Hudson. The agreement was never ratified by the duke or the king, and the



alleged error was the groundwork of a long-continued and distracting controversy. New Jersey was clipped from the New York province, to please two of the duke of York's devoted friends, even while the conquering expedition was on its voyage, and Nicolls knew nothing of the transaction until the arrival of Philip Carteret as governor for the new dominion.

The anomalous condition of New York required special laws. Under the despotic patent of the duke, Nicolls was the real maker of the laws, and also their interpreter. He erected a court of assizes, consisting of the governor and council, to be the chief supreme tribunal of the province. He shortly divided Long island, or Yorkshire, into three districts or ridings; a court of sessions, to be held by the justices of the peace in each three times a year, over which the governor or any counselor might preside, and these justices and the high sheriff of each district were to sit in the court of assizes once a year—the last Thursday in September. The next step was to frame a code of laws. New York had no charter like the New England colonies, was not a royal domain like Virginia, and differed materially from the proprietary of Maryland. Hence Nicolls borrowed all that was practicable from the experience and wisdom of his neighbor colonies, examining the laws in actual operation among them, and fashioned his code to suit the special exigencies of the conquered province. Among its provisions were trials by jury, arbitration in small matters, and a local court in each town, from which there was an appeal to the court of sessions.

The tenure of real estate was to be from the duke of York, involving new patents and fees; no trading with the Indians was to be allowed without a license; negro slavery was recognized; death was the punishment for denying the true God, for murder, for treason, for kidnapping, for the striking of parents, and for some other offenses; every town in the province was to provide a pillory, a pair of stocks, and a pound. Existing schools were to be continued, clergymen supported, and no person who professed Christianity was to be molested, fined, or imprisoned for differing in opinion from the doctrines of the established church on matters of religion. There were also numerous regulations on a great variety of minor matters. A convention was called at Hempstead, where, after an animated discussion, resulting in some important amendments, the code was adopted, and was generally known as "the duke's laws".

At the same time the first race-course in New York was established at Hempstead, on a grassy plain unmarred by stick or stone, 16 miles long and 4 wide. Nicolls directed that to improve the breed of horses in the province a plate should be run for every year. The race-course was called "Newmarket", after the famous English sporting ground, and was subsequently for many decades a favorite annual resort for the governors of New York and the farmers of Long island.

In the mean while a tempest of trouble for New York was brewing on the opposite side of the Atlantic. The seizure of the city and province by the English in a time of profound peace was stigmatized as an act of base treachery. Its loss gave to the West India company its final death-blow, but the statesmen of the Dutch republic haughtily resented the insult, and declared that "New Netherland must be restored". Every Dutch city offered men and money to the government, and a war was presently raging, in which Dutch fleets not only swept the Channel, but entered the Thames, burned the warehouses and dock-yards at Chatham, and maddened and terrified the citizens of London with the roar of their cannon.

When the news reached Nicolls, he tried with his slender means to strengthen the fort and fortifications of the city; but with so large a Dutch population eager to welcome the restoration of Dutch authority, he could hope for little assistance, and England was in too much misery to attend to his wants. Calamity followed calamity. The victorious Dutch dictated the terms of a treaty signed at Breda, July 31, 1667, but singularly enough they gave up New York—the very occasion and prize of the fierce conflict—for Poleron, Surinam, and Nova Scotia. Nicolls had impoverished himself personally for the public good, and asked about the same time to be relieved of his government. Indeed, in the same vessel which brought the glad tidings of peace across the seas came his recall.

Colonel Francis Lovelace succeeded Nicolls as governor of New York. He made no attempt to disturb the policy which had proved so satisfactory, but he found his field of labor hedged in by many thorns. Conflicting claims about lands had stirred up quarrels in every part of the province. Extremes of evil and good were singularly linked together, and the situation was greatly aggravated by the absence of any uniform nationality; some of the habits and customs were Dutch, some English, some French, some Christian, and some heathen. There was not exactly a babel of tongues, but frequently three languages were spoken at the same fireside. The French and the Dutch had intermarried in all the decades. France was at this time the greatest power in Europe, and stood like a perpetual menace to the rest of the world. Ere long the famous coalition known as the "triple alliance" rendered the English and Dutch more interesting to each other than ever before, and France was compelled to treat with Spain on reasonable terms. The effects were quickly apparent in New York, and a prosperous era dawned upon the growing city.

One of the memorable events of Lovelace's administration was the purchase, in 1671, of the farm—about 62 acres—formerly belonging to Dominie Bogardus and his wife, Anetjé Jans, which had been confirmed to his heirs by Nicolls in 1667. It adjoined the West India company's farm, which the duke of York held by virtue of confiscation. Lovelace bought the property for his own benefit and in his own name.

Peace abroad was, however, of short duration. England and France secretly united to destroy the power of the Dutch provinces, and another war was the consequence. The progress of New York was checked with the first

news of the commotion beyond the seas; merchants were hampered and on the eve of bankruptcy, and commerce was injured in every direction. Lovelace was engaged in the laudable endeavor to establish an overland mail between New York and Boston during the winter and spring of 1673, and while attending to some business in this connection in Hartford, in July, a Dutch fleet appeared in the harbor, and with very little ceremony captured the fort, city, and province. The message sent by the admirals to the commander of the garrison, ordering him to surrender, contained these words: "We have come to take the place, which is our own, and our own we will have." The three-colored ensign of the Dutch republic rose to its old place on the flagstaff, New York became again New Netherland, and the city was called New Orange, in honor of the young prince.

#### NEW YORK AS NEW ORANGE—1673-1674.

Anthony Colve was chosen governor of the conquered territory by the admirals, and a commission was given him similar in phraseology to those issued by the crown of England. He was a coarse, passionate man, whose manners had not been improved in military service; he assumed princely airs, spent money extravagantly, and lived ostentatiously. The admirals kept their ships in sight until the old form of city government was restored by the election of a new board of burgomasters and schepens, and soldiers were sent to reduce Esopus and Albany, and encountered no opposition. Lovelace returned to the city and was courteously entertained by the conquerors, but his property was confiscated, which left him no means of paying his debts, and he was arrested by his creditors. He soon after sailed for Europe. Every thing in and about the city assumed a military air. All the defenses were strengthened, and no person was allowed, on pain of death, to enter or depart from New York, except through the city gates. At sundown the gates were closed, and a watch was set until sunrise. Citizens were forbidden to extend hospitality to any stranger or to hold any correspondence whatsoever with the people of Massachusetts and Connecticut. Whoever had not taken the oath of allegiance was expelled from the city.

About a month before the capture of New York, while the Dutch fleets were on the ocean, the United Provinces yielded so far to the dictation of Spain as to promise to sign certain articles of peace with England as a political necessity. It involved a mutual restoration of conquests. When the Dutch statesmen heard of their American acquisition they were painfully embarrassed; but the sacrifice was inevitable. The treaty was signed at Westminster on the 9th of February, 1674. The news reached New York in June, and Governor Colve was instructed to restore the province to whomsoever the king of England should depute to receive it. October came before the new English governor. On the 22d two frigates anchored off Manhattan island, and Sir Edmund Andros notified Governor Colve of his presence and his readiness to receive the scepter of command. Eight days were requested, by advice of the council and city fathers, in which to complete necessary preliminaries. A committee of leading Dutch citizens paid a visit of welcome to Andros, their object being to request privileges for the Dutch inhabitants of New York. They were received with courtesy, invited to dine, treated to the choicest of wines, and assured that every Dutch citizen should participate in all the liberties and privileges accorded to English subjects. To the series of questions relating to the settlement of debts, the validity of judgments during the Dutch administration, the maintenance of owners in the possession of their property, the retention of church forms and ceremonies, etc., Andros promised favorable answers when he should have assumed the government, which promise was honorably fulfilled.

On Saturday, November 2, Andros landed with much ceremony, and the formal transfer of the province was celebrated; the city on Manhattan island became once more, and for all future time, NEW YORK.

#### NEW YORK UNDER SIR EDMUND ANDROS—1674-1683.

A new patent had been issued by King Charles II to the duke of York, which read curiously as if no previous English patent had ever existed. It conveyed ostensibly for the first time a territory which the Netherlands, after conquering and holding, had by treaty restored. New Jersey was once more the property of James, with all the territory west of the Connecticut river, Long island, and the adjacent islands, and the region of Pemaquid. The question touching the duke's title to New York had been argued at Whitehall, and some of the most eminent lawyers in England had decided that all subordinate right and jurisdiction had been extinguished by the Dutch conquest, and that the king alone was proprietor of the province according to the treaty of Westminster; hence the new patent. Of course boundary dissensions, litigations, fines, and heart-burnings must begin at the original starting-place and be lived over again. The proprietors of New Jersey found themselves without any legal right to their estates, and complained with such vigor that James issued another grant to Carteret, without altering the commission of Andros, which comprehended New Jersey. This furnished the text for a long chapter of disputes and difficulties—almost a civil war.

By the duke's order Andros seized the former property of Lovelace, and required all persons possessing any portion of it to account. An attempt was made to hold the Connecticut territory named in the patent; Andros visited Saybrook with an armed force, but finding the people prepared for a determined resistance he prudently



retired, unwilling to shed blood. The Indians were hostile, and it was a time of great tribulation throughout the country. The city gates were closed at 9 o'clock and opened at daylight. Every citizen was required to possess a musket, with a small quantity of powder and ball, and to take part in the night-watch when called upon.

In 1676 the famous canal at Broad street was filled and made level with the land on either side. The tan-pits thereabout, having been denounced as a nuisance, were removed to the marshy valley along Maiden lane. Many good dwellings were by this time erected, and all owners of vacant lots were ordered to improve them, under penalty of having them sold at public auction. In 1677 Stephanus Van Cortlandt was appointed mayor, the first native-born citizen who had as yet filled that office. He had been educated under a learned tutor, and, although of Dutch birth, was accomplished in French and English. His wife was Gertrude Schuyler, a sister of the famous Peter Schuyler, the first mayor of Albany. Mayor Van Cortlandt carried into execution the digging of the first public wells in the city, six in number. They were a failure, as the little water they contained was brackish, but they answered as a public security against fires. The most important public measure of 1679 related to Indian slaves, who were declared free, except such as were brought into the city from foreign countries, and even these were entitled to their freedom after a six months' residence in New York.

Andros visited England during his administration, and while at court took occasion to report the behavior of the New England colonies toward New York, a subject that was at once investigated by the privy council. The resentment inspired may have had much to do with events in Boston ten years later. About this time peace was established between the French and the Dutch. But the English claims of sovereignty over the Iroquois, which Andros had asserted, roused the French king, and strenuous efforts were soon made through the Jesuit missionaries to incline them toward their Canadian neighbors.

Not far from the same date, New York and New Jersey engaged in an interesting quarrel. New Jersey had been trading directly with New England. Andros executed the duke's order that all vessels should enter at the New York custom-house. New Jersey resisted, enacting a law to indemnify any ship which might be seized by New York officials for entering and clearing at Elizabethtown. Every Jersey-bound vessel was seized, and duties were exacted before it could pass Sandy Hook. The two governors, Andros and Carteret, were kinsmen, and hitherto on personally intimate terms. But all friendly intercourse ceased, and Andros issued a proclamation forbidding Carteret to exercise further authority within the duke's province, demanding, at the same time, the surrender of his person. Carteret appealed to the king. The New Jersey people were loyal to Carteret, and for three weeks extreme measures were delayed. Then Andros sent a band of armed men to New Jersey in the night, who found no difficulty in entering Carteret's unguarded country house and making him their prisoner. He was incarcerated and tried for "unlawfully assuming jurisdiction over the king's subjects", before a special court of assizes, over which Andros presided in great state. But the honest verdict of a New York jury was in favor of the accused. He was acquitted and allowed to return to his home, under bonds to assume no authority, civil or military, until his case could be decided in England. Thus Andros practically obtained control of the New Jersey province. The Quakers of West Jersey complained of his high-handed proceedings, and a series of episodes followed which compelled the notice of the duke. Andros was ordered to report in person at the English court, and sailed from New York January 6, 1681.

#### DONGAN'S ADMINISTRATION, 1683-1688.

The selection of a new governor for New York was much discussed by the royal brothers, Charles II and the duke of York. It was not easy to invent a scheme by which the unprofitable property could be made to yield a revenue. The duke thought seriously of offering New York for sale. "Keep the province and give it the franchise", counseled William Penn, and this method finally prevailed. Special instructions, in which an assembly was granted, were prepared for Thomas Dongan, an accomplished soldier and politician, who had recently officiated as lieutenant-governor of Tangier, in Africa. He was a bachelor of fifty, of fine presence and agreeable manners, and a Roman Catholic. He reached New York in the summer of 1683, and before the year went out the long-desired colonial assembly was an established fact in New York. The duke retained in his own hands the appointment of governor and counselors, but granted "free liberty to consult and debate in all affairs of public concern" to the new legislative body, and he gave to the freeholders the right of electing representatives in assembly.

This august body first met October 17, 1683, and continued in session three weeks. It enacted fourteen important laws, all of which were approved by the governor. It divided New York into twelve counties, established four courts of justice, and ordained that all actual inhabitants of the province, except slaves, were citizens, of whatever foreign nation, if they professed Christianity and took the oath of allegiance to the government. These laws were sent to the duke of York, who after suggesting some slight amendments, which were duly acted upon, signed and sealed the instrument; but owing to serious political complications in England it was not perfected by delivery.

Following close upon the meeting of the new assembly, the mayor and common council petitioned the governor for a confirmation of the "immunities and privileges" granted to the city by Nicolls, with certain additions, including

the division of the city into six wards. This was granted, and when the officers for the ensuing year were re-appointed, the first recorder, James Graham, was commissioned, who took his place on the bench at the right hand of the mayor.

The year 1686 was distinguished by the granting of the "Dongan charter" to the city, through which sources of immediate income were vested in the corporation. The city hall, the two market-houses, the bridge into the dock, the great dock and wharf connected therewith, the new burial-ground, the ferry, and the waste, vacant, unpatented lands on Manhattan island reaching to low-water mark, together with the rivulets, coves, creeks, ponds, waters, and water-courses, were conveyed specifically to the corporation. This liberal charter was drafted by Mayor Nicholas Bayard and Recorder James Graham, and was the basis of a system of government for a great city.

Meanwhile, the death of Charles II and the ascension of James to the throne of England seriously affected New York affairs. The assembly was abolished, James II, as king, being afraid it might abridge his power. Soon came the consolidation of New York and New England under one government. Sir Edmund Andros was appointed to the supreme command, and Dongan was displaced, although his counselors, Brockholls, Philipse, Bayard, and Van Cortlandt, were sworn into the new administration. Headquarters were established in Boston, and thus the New York counselors found their official importance increased, rather than diminished, as they could henceforward vote upon the affairs of Boston as well as upon those of New York.

### THE ENGLISH REVOLUTION.

But changes came swiftly. Revolution in England, through which James abdicated his throne and William and Mary seized the reins of power, resulted in widespread insurrection in the American colonies. Boston arrested and imprisoned Governor Andros, as well as the other officers of the crown. New York was intolerant both of popery and of puritanism, and ready to plunge headlong into intense devotion to a Dutch prince so suddenly transformed into an English king. In the confusion which prevailed, all manner of wild rumors were in circulation. Some said King James was about to land on the New Jersey beach with a French army, others that Staten island was alive with roaming papists. Suspicions that the Dutch magistrates were all going over to popery passed from lip to lip until the panic became general. Jacob Leisler usurped the government, changed the name of the fort from James to William, and called a convention to organize a committee of safety. His zeal greatly exceeded his wisdom, and his brief rule was an unbroken chapter of arbitrary proceedings.

Addresses and petitions after a while turned the attention of King William to the condition of New York. He commissioned Henry Sloughter governor, and Richard Ingoldsby lieutenant-governor, and ordained a form of government for the province, which continued substantially in operation for nearly a century. He permitted the election of an assembly by the freeholders of the several counties, the governor and council being as heretofore appointed by the crown. These authorities, in their mimic sphere, shadowed the king, lords, and commons of England; but the name of Leisler was not mentioned in the appointment of Sloughter's counselors.

The fleet was a long time on the ocean, and the vessel under the command of the lieutenant-governor was the first to arrive in New York harbor. Leisler, taking advantage of a technical dilemma, refused to surrender the fort unless Ingoldsby produced written orders from the king and governor. Upon Sloughter's appearance, six weeks later, the demand for entrance to the fort was not promptly obeyed, Leisler claiming that it was unmilitary to surrender a citadel in the night-time. He wrote an apologetic letter in the morning, tendering the fort and government to the new governor, not having the slightest intention of placing himself in the direct attitude of rebellion against his royal master; but his conduct was so interpreted, and he was incarcerated in the same dungeon where Bayard and Nicolls had suffered for many months. His son-in-law, Jacob Milbourne, and eight of his counselors were also committed to prison.

The trial of these men occupied eight days, and all but two were condemned to die, according to the barbarous English law then in full force. The six counselors were subsequently pardoned, but Leisler and Milbourne were executed. The event left its abiding mark upon New York history. Opinions clashed in relation to it, and Leisler became a martyr in memory, and his death the stock of a party which for years, by its triumphs and defeats, retarded seriously the prosperity of New York.

Governor Sloughter died suddenly about two months afterward, and his remains were placed in the Stuyvesant vault by permission of the family.

During the next ten years the city's growth was uneven. The mayor, appointed in the autumn of 1681, was Abraham De Peyster, who found that the revolution had disturbed every man's private affairs. Property had been seized for taxes, neighbors were suing each other for debts and damages, and insubordination against the city laws was of daily occurrence. It was almost impracticable to restore public tranquillity.

Governor Benjamin Fletcher was the successor of Sloughter in the government of the province. He was dined on his arrival by the city corporation, and immediately after his first trip into the Mohawk country to treat with the Indians was presented with a gold cup, which cost the mayor and aldermen £100. But he was not in harmony with the assembly, and several times broke up the session in high temper. The two political parties were in a perpetual wrangle with each other, and he had great difficulty in obtaining appropriations necessary for the conduct of the government and the protection of the frontiers.

## PIRACY.

Suddenly the city exhibited signs of unmistakable wealth; more money was in circulation than ever before. The merchants extended their commerce, and many expensive houses and stores were built. The privateers and pirates, who were sustained by the French war, sailed into the harbor to buy provisions in exchange for gold and valuable commodities from the East, and they came and went unmolested. Piracy had long been in existence, and was encouraged rather than frowned upon by the European governments. Many free-sailors held commissions from the king of England to annoy France. Before long, however, the ships of all nations were captured, plundered, and destroyed, not excepting those of Great Britain herself. Fletcher had, in common with the practice in England, commissioned sea-captains to raise men and act as privateers against the French, and had accepted bonds and promised protection. The Leislerians accused him of conspiracy with the pirates, and presently it was said that some of the wealthiest and hitherto the most respectable citizens of New York were sharing the spoils of ocean robbery. The remarkable influx of strangers into the city, the rich goods exposed for sale, and the free circulation of Eastern gold seemed to confirm the statement. The lords of trade brought the subject before the king as soon as he was capable of attending to business after the death of Mary. It was decided that Fletcher must be recalled, and Lord Bellomont, who had been the treasurer and receiver-general of Mary, and the personal and confidential friend of William, was selected for the governorship as the man above all others who would be most likely to put a stop to piracy.

## LORD BELLOMONT'S ADMINISTRATION—1698-1701.

He reached the city in April, 1698. A genuine nobleman, of attractive, commanding presence, large-sized, somewhat above the ordinary height; with finely-shaped and well-poised head; a face stamped with iron firmness; dark, magnetic, kindly, expressive eyes, and small, soft, white hands. He had a sound heart, honorable sympathies, and an honest desire to do justice to all; but his opinions were apt to be formed by the first hearing of a case. He was inflexible in his aversions, and he was borne swiftly into the political whirlpool. He had listened to the aspersions cast upon the character of Fletcher by the Leislerians at the English court, and prepared to pronounce wholesale condemnation upon all the acts of his predecessor. Some of his counselors were owners of merchant vessels, and he soon discovered that they were meeting daily at the lodgings of Fletcher, who had not yet sailed for England. Moreover, they did not come cheerfully to his assistance when he attempted to enforce the laws of trade, and he heard expressions of surprise that there must needs be such an unexpected disturbance. The seizure of ships and East India goods created a popular tumult. The merchants resisted, and the officers were in many instances threatened to such a degree that they chose rather to resign than to execute justice. On one occasion each of three constables who had been ordered to seize goods disappeared from public view. The same day a report reached Bellomont that the sheriff himself was concerned in the receipt of East India goods, and that a large quantity was concealed in his house. The governor sprang to his feet and sent an order to the searcher of customs to take them at once. While the officers were in the garret of the offender packing the goods for removal to the custom-house, the doors were suddenly locked, and it was not until late in the evening that Bellomont heard of their incarceration and sent a file of soldiers to liberate them.

"I am obliged to stand upon my own legs", Bellomont wrote to the king; "my assistants hinder me, the people oppose me, and the merchants threaten me. It is indeed uphill work." But it must be remembered that the acts of trade were despotic in their character and contrary to the rights of humanity. No voice of conscience ever seemed to declare their violation a moral offense. They were evaded in every part of the kingdom. The reason will be apparent to intelligent minds when they pause to analyze the nature of the vexatious laws.

No commodities might be imported into any British settlement in Asia, Africa, or America, or exported thence but in vessels built in England or in her colonial plantations, and navigated by crews of which the captain and three-fourths of the sailors were English subjects. The penalty was forfeiture of ship and cargo.

No one but a natural-born subject of the English crown or person legally naturalized could exercise the occupation of merchant or factor in any English colonial settlement. No sugar, tobacco, cotton, wool, indigo, ginger, or dyestuffs produced in the colonies should be shipped from them to any other country than England, and ship-owners were required at the port of lading to give bonds with security proportioned to tonnage. The prohibited articles were called "enumerated", and as soon as any new articles were brought into notice through the ingenuity and industry of the colonists they were added to the list. It forbade also the importation of any European articles into colonies save in vessels laden in England and navigated as above described. It was the policy of nations to keep the trade of the colonies confined to the parent country. Charles II imposed a tax of 5 per cent. on all goods imported into or exported from any of the dominions of the crown. Parliament went a step farther and taxed the trade which one colony carried on with another.

New York had become a nest of pirates, the place having been chosen on account of its central geographical position, and nearness to the open sea. Bellomont suspected the members of his own city council of protecting the pirates. He proclaimed his convictions with emphasis. But as the news that Captain Kidd had raised the black

flag was fresh and the possible complicity of Bellomont himself was on men's lips all over the world, his charges only brought counter-charges, and the excitement became intense. Rumor distorted facts, and some of the most respectable residents of the city were accredited with the darkest deeds. Colonel Bayard was exasperated with the charges preferred against himself, and made a voyage to England to personally enter complaints to the lords of trade and the king.

Bellomont's democratic theories found expression shortly after in a bill to prohibit any one person from holding more than 1,000 acres of land under any circumstances. It was a fierce blow leveled at the great landholders of New York. He thought their wealth had been dishonorably obtained. He had no sympathy with feudal lords. Many of them were proprietors of tracts from 20 to 40 miles square. Men of small means could not obtain a foothold in the province. The bill met with sharp opposition in the council, but of the six counselors present three were for it, therefore Bellomont gave the casting vote.

In the assembly, which at the recent election had changed its politics, so to speak, and was now controlled by the Leislerians, the bill was discussed in high temper, but the vote was in the affirmative. One of the Dutch clergymen, Dominie Dellius, whose two large estates were under condemnation, at once sailed for England to appeal for justice. The whole city was in a foment. Trinity church was to be deprived of its property by the new law, and the church wardens and vestry petitioned the lords of trade to prevent Bellomont from pursuing such a course. The amiable rector, Rev. Mr. Vesey, felt personally aggrieved and ceased praying for the governor and his family. The lords of trade were amazed at the petitions that were filling up their tables, and the indignant ambassadors from New York stood boldly before them in defense of rights civil and political. The result was a friendly caution to Bellomont from the king; and the act for breaking the grants, which had been forwarded to the lords of trade, was laid on the table for future consideration. Bellomont said he had only carried out the instructions of the crown, and if he was not sustained in his course he should resign. He intended to break all the grants—Schuyler's, Van Rensselaer's, Livingston's, Van Cortlandt's, Philipse's, Smith's, Nicolls', Beekman's, Morris', etc., and he made an effort to annul the charter of the Dutch church, on the ground of its having been obtained through bribery.

Bellomont was in Boston for a few months, his commission constituting him governor of Massachusetts and New Hampshire; and he found there, as in New York, two powerful parties, and the acts of trade violated and the collection of customs neglected. When he returned to the metropolis he wrote to the lords of trade that piracy was on the wane, but he "expected New York would be flooded with gold upon the arrival of one of the ships of Counselor Philips", which was due. The first board of trade in New York, then about three years old, consisting of 7 members and a president, attempted to exercise immediate supervision over the commerce of the colony; but the persistent violation of the revenue and other laws compelled the adoption of stringent measures, and presently it had become as odious to the merchants as had Bellomont himself.

All at once the London merchants, incensed at the obstacles interposed in the way of business, petitioned the king in behalf of the aggrieved New Yorkers. In the same breath, as it were, a petition from New York, signed by 33 of the leading merchants, prayed for restoration to peace and prosperity. This last-named document contained 32 distinct complaints against Bellomont; the 32d declaring that he had vilely slandered eminent and respectable persons in order to justify his arbitrary proceedings. The accusation of piracy and of trading with pirates was pronounced false in every particular, the only basis for such suspicions being, it was said, the fact that several of the rich gentlemen of New York owned ships that went to Madagascar for negroes, and sometimes met with India goods which they would buy at easy rates, but could always furnish a true report of the same.

Meanwhile the other American colonies were aroused, and attempted to defend the New York merchants. The governors of Maryland and Pennsylvania tried to effect a reconciliation. The movement irritated Bellomont, and was without advantage to the merchants; he expressed his views hotly; said those who expected him to permit unlawful trade and piracy would find themselves mistaken, for he should be "as steady as a rock on that point"; and furthermore, that he should anticipate insolence until the act breaking the grants of the landholders was ratified in England.

In the early part of the year 1701 Lord Bellomont died, and was interred in the chapel of the fort in New York. The event caused a profound sensation. What would have been the result of his peculiar policy had he lived can never be known. His errors were chiefly in judgment. Even his enemies admitted that he was actuated by conscientious motives. His courage in raising an individual arm against so many powerful adversaries was marvelous, and almost any other man would have fallen in the fray. He failed to destroy the political influence or to lower the social position of the gentry of New York; but through his energy and instrumentality piracy received a check from which it never recovered.

His death plunged New York into fresh difficulties. The lieutenant-governor was absent and the government was without a head. The council met to consider the situation. A dispute arose as to who should preside. The oldest counselor, Colonel William Smith, claimed the chair. The other counselors present thought a vote should be taken. Day after day passed in animated controversy. Meanwhile Abraham De Peyster acted as president of the council. The struggle was for the supremacy of party. The Leislerians in the council were impatient for a

meeting of the assembly. Smith suspected a design of attempting to pass bills of private consequence, which Bellomont had been prevented from doing only by the superior discernment of the lords of trade, and he valiantly contended that the assembly was actually dissolved by the governor's death.

It was in the month of March, and two of the counselors, Robert Livingston and Peter Schuyler, who resided in Albany, had been delayed in reaching New York by the breaking up of the ice in the Hudson river. On the 21st they arrived, and both sustained Smith in the important interests at stake. But it was only three against four. The scheme of revenge was charged squarely upon the Leislerians. In turn fraud and all manner of mischief was charged upon the aristocrats. The eloquent vituperation and stinging sarcasm which echoed from wall to wall in the council chamber was unequalled in the history of the colony. The clamor of the angry disputants became so loud and threatening that the residents of the neighborhood were panic-stricken. The assembly met on the 2d of April, but was obliged to adjourn from day to day on account of the quarrel in the council. The written explanation of both parties was sent to the house, and it was decided that the council had the right to govern by the majority of voices. Yet the nature of the affair was irreconcilable, and the minority too determined for the assembly to transact business with safety. Therefore an adjournment was in order until the arrival of the lieutenant-governor, in June. His first act was to dissolve the assembly and order a new election. The contest was one of the most bitter and demoralizing that ever occurred in New York. Both parties brought all their strength to the front. There was illegal voting everywhere. Then the elections were sharply disputed. The Leislerians gained the victory, but in choosing a speaker another painful disturbance arose. Out of the 21 members of the new assembly, 10 voted for Abraham Gouveneur (the son-in-law of Jacob Leisler), and 9 for William Nicolls, one of the eminent leaders of the aristocratic party. The minority claimed that Gouveneur was an alien, for which assertion several of the gentlemen were prosecuted for libel. The majority objected to Nicolls that he was not an actual resident of the county where he was elected, thus not properly qualified to act as member of the assembly in any event, and he returned in anger and appealed to the king for redress.

Following this came the demand for a committee to audit the public accounts, a proceeding aimed directly at Counselor Robert Livingston, who had been accused of fraud. He indignantly refused to appear before such a tribunal, knowing there was not a shadow of proof against him; but the party in power never rested until they had vilified him to such a degree that a bill was passed removing him from the conduct of Indian affairs, depriving him of his seat in the council and of all his other offices, and confiscating all his estates, real and personal. He remained under the cloud until 1703, when he was justified before the world through the restoration of his property by the crown; and two years later Queen Anne reinstated him in all his former appointments and honors.

The disorderly conduct of the city elections was as notable as those of the province. Both parties were on a mad race and paid no respect to the rules of decency. Several bloody skirmishes between individuals occurred at the polls. Every one knew there was illegal voting, and every one concerned denied it with emphasis. At the end both parties claimed the victory; and following this New York witnessed one of the most extraordinary scenes in all history.

The common council consisted of 6 aldermen and 6 assistants; thus, should the party division be equal, Thomas Noell, the new mayor, who belonged to the "aristocracy", would have the casting vote. But the Leislerians, in defiance of all custom, were severally sworn into office by the retiring mayor, who was of their own party. When Noell, in the usual manner, proceeded in solemn state to the city hall and entered upon the ceremony of swearing in the members-elect, a tumult arose beyond description. Shouts from all parties and from the citizens present prevented the transaction of any business whatever, and, fearful of bloodshed, Noell dissolved the meeting.

As was natural, the new mayor refused to sit by aldermen who would not be sworn in by him; but the common council being the only legal authority for scrutinizing disputed elections, the city was in danger of being without a government. The case was too serious for delay, and Noell took upon himself the responsibility of appointing four men in each ward to inspect returns. The Leislerians whom he placed on these committees refused to serve, declaring the performance irregular. The others went about their work and found the aristocratic party in the majority. The mayor then called a meeting in the city hall to swear in the new aldermen. Those who would be displaced by the action joined in the procession, and they all marched along the streets and entered the hall together; they took their seats side by side, with angry faces and compressed lips. The mayor arose and attempted to swear in such aldermen as had been legally elected. Yells of disapproval were heard from every part of the hall. The oaths were, however, administered in spite of the deafening roar of voices. When the mayor proceeded to business, all took part with audacious effrontery, and he was obliged to adjourn the board for two weeks. The case went before the supreme court, which decided upon an equal division of the aldermen and assistants between the two parties; and as Mayor Noell and Recorder Gouveneur were opposed, the board stood equally divided.

Suits were instituted about the same date by the Leislerians against the widow of Stephanus Van Cortlandt to compel the payment of an alleged deficit in her late husband's accounts with the government. She defended herself fearlessly from what she believed a matter of implacable malice, and Lord Cornbury arrived from England just in time to save her from being publicly annoyed.

The crowning event of that terrible year (1701) was the arrest and incarceration of Colonel Nicholas Bayard for "high treason". He had been concerned in preparing a petition to the king asking for a governor who understood the principles of government, and whose sentiments were in unison with those of parliament. Petitions had always been the acknowledged right of English subjects, and there was nothing in the papers contrary to English law. But the movement had been conducted with secrecy, and the document was burdened with 600 signatures, chiefly of leading men of the aristocratic party. Party spirit interpreted it as a "conspiracy", and party rancor conducted a trial which resulted in a verdict of "guilty"; and Chief Justice Atwood pronounced the horrible English sentence of traitors, then in full force. The day of execution was fixed. Bayard begged for a reprieve until the king's pleasure should be known, and the governors and prominent men of the neighboring provinces interceded, all to no purpose. He must perish as Leisler had perished. The only possible method offered him for a reprieve was to confess to the crime of treason, which he could not do. Finally, at the last moment, friends drew up a petition so worded as to express his sincere sorrow for the offense of signing the addresses and encouraging others to sign, and it obtained the coveted reprieve, but did not liberate him from imprisonment and irons.

While the city was astir with these and other excitements, Lord Cornbury sailed into the harbor and landed with much ceremony. His coming at this juncture was extremely fortunate, else the Leislerians by their excesses would have sown discord beyond all hope of future remedy. The case of Colonel Bayard was uppermost in men's minds and on men's lips. Three sentences could not be uttered by any one without allusion to it. Thus the new governor gave it his first attention. He found that the trial had been irregularly conducted, and that the victim was to be executed for *supposed written treason* which had never been produced as evidence or shown to be treason. The chief justice, Atwood, and the solicitor-general, Weaver, suddenly found themselves standing in an odious light, and absconded under assumed names; and the queen, by advice of the council, reversed the sentence pronounced upon both Bayard and Hutchings, and reinstated them in their property and honors "as if no such trial had been".

Cornbury's presence toned and mellowed political animosity by uniting the forces which had so nearly precipitated the colony into a civil war in one bond of opposition against himself. His unfitness for his position was very soon apparent. He had no sympathy with the primary notion of popular rights, he lacked the persistent industry of Bellomont, and with many private vices he possessed little tact or discretion. He soon lost favor with all classes. His career taught New York to withdraw confidence from foreign rulers, to study the rights of British subjects, and the necessities as well as the methods for resistance. From that time forward until the spirit of independence found full expression in the declaration of 1776, New York was ceaselessly agitated with questions that were comparatively at rest in the other colonies, and prosecuted its encroachments upon arbitrary power step by step. The French war had necessitated appropriations in 1707 for the defenses of the city. The next year an alarm was created by the appearance of a French privateer in the harbor. There was a general outcry against Cornbury for misappropriating the funds and neglecting the defenses. He declared that the money had never been collected. But the New York people resolutely insisted upon having a treasurer of their own, and the assembly appealed to the queen. The result was a gracious permission, and Abraham De Peyster was appointed the first treasurer of New York.

Cornbury was excessively prodigal in the use of money, spent much time in frivolous amusements, often dressed himself in women's clothes to show his remarkable resemblance to his cousin, Queen Anne, and was negligent about paying his debts. The gentlemen of his council were mortified and disgusted with his exhibition of weakness and eccentricity.

The temper and intelligence of the assembly in 1708 is indelibly recorded in a list of resolutions which were drafted and sent to the queen by a committee of which William Nicolls, speaker of the house, was chairman. Of these we quote the 3d, 4th, 5th, and 6th as illustrations:

*Resolved*, That the imposing and levying of any moneys upon her majesty's subjects of this colony, under any pretense or color whatsoever, without consent in general assembly, is a grievance and a violation of the people's property.

*Resolved*, That for any officer whatsoever to extort from the people extravagant and unlimited fees, or any money whatsoever, not positively established and regulated by consent in general assembly, is unreasonable and unlawful, a great grievance, and tending to the utter destruction of all property in this plantation.

*Resolved*, That the erecting a court of equity without consent in general assembly is contrary to law, without precedent, and of dangerous consequences to the liberty and property of the subjects.

*Resolved*, That the raising of money for the government, or other necessary charge, by any tax, impost, or burden on goods imported or exported, or any clog or hindrance on traffic or commerce, is found by experience to be the expulsion of many and the impoverishing of the rest of the freeholders, planters, and inhabitants of this colony; of most pernicious influence, which if continued will unavoidably prove the ruin of the colony.

The mercantile impetus to which New York is indebted for her present commercial importance, and which Bellomont found so formidable when he began to question the processes by which men enrich themselves, originated with the stirring citizens who accumulated private fortunes before modern improvements and business facilities were introduced into the country. They were tirelessly active, were liable with every turn of the political wheel to be tumbled into the slough, were obliged to perform military duty, and wars and rumors of wars were perpetual, and their money was constantly in demand to save the credit of the colony. Bellomont seems to have been almost a monomaniac in the matter of curtailing landed estates, under the firm conviction, on general principles, that large



wealth among the few was injurious to the prosperity of an infant colony. But it is impossible to trace the growth and development of New York without pondering over the remarkable events of the twenty years from 1689 to 1709 with profound interest, the period which may properly be styled the beginnings of revolution and of commercial power.

Cornbury was succeeded in 1709 by Lord Lovelace, baron of Hurley, nephew of the former governor of New York of that name. He dissolved the assembly and ordered a new election. When the house met and had again chosen William Nicolls speaker, Lovelace recommended the raising of a revenue for seven years as formerly. The response was courteous, but it was firmly decided to raise the revenue annually and appropriate it specifically. In May the illness of Lord Lovelace assumed an alarming character, and on the 6th he died.

In the interim, before the arrival of a new governor, an attempt was made to drive the French out of Canada. The English minister promised to send a large fleet to the assistance of the colonists. Peter Schuyler went among the Iroquois and persuaded them to take up the hatchet once more, and all the colonies agreed to assist. The assembly issued bills of credit, and the greatest activity prevailed. Finally, the army was in readiness and marched through the wilderness to lake Champlain. But no British fleet came to aid, and the disappointment was overwhelming.

Schuyler deplored the failure of the expedition to such a degree that he resolved to go to England and lay the subject personally before the lords of trade. He was convinced that not only the safety but the very existence of the colonies was at stake unless the border warfare could be terminated. Vigorous measures must be adopted against the French. To make his mission more effective, he took with him at his own private expense five Indian chiefs.

#### HUNTER'S ADMINISTRATION—1710-'19.

In June, 1710, Robert Hunter reached New York and assumed the governorship. He was a strong, active, cultivated man of middle age, with refined tastes, exceptional learning, and charming manners. One of the notable events of his administration was the negro insurrection of 1712. At that date nearly half the population of the city was colored, slaves having been imported in large numbers during recent years. Wealthy families in several instances owned as many as fifty each. A few, who had met with hard usage, set fire to the city and massacred several persons in the most shocking and brutal manner. Twenty-one of the assassins were captured by the authorities and executed, some of whom were hanged and others were burned at the stake. The city had progressed very little during the first twelve years of the century. But business was more prosperous in the next decade, and accessions to the population produced a healthy rise in the value of real estate. Governor Hunter was in harmony with his council in all matters of public interest, but in constant collision with the assembly. The two branches of the legislature had an interesting controversy with each other. The council attempted to amend several bills sent from the house, and the latter denied the right. The council defended its course from its relative position as upper house, or house of lords. The assembly said both houses were alike commons, and the council only an advisory board—in other words, a cipher in the government; the assembly was the free choice of the people, and thus had an inherent right to dispose of the money of the freemen of the colony, and refused to be dictated to by the action of any former assembly or by the opinions of the lords of trade. Some of the members openly denied the right of the queen to fix salaries for her colonial officers. Hunter established a court of chancery and exercised the office of chancellor himself. The assembly immediately passed the following resolutions:

*Resolved*, That the erecting a court of chancery without consent in general assembly is contrary to law, without precedent, and of dangerous consequences to the liberty and prosperity of the subjects.

*Resolved*, That the establishing fees without consent in general assembly is contrary to law.

The council wrote an account of the matter to the lords of trade, who expressed entire approval of the court. William Nicolls, however, who was an astute lawyer, well skilled in the interpretation of English law, predicted that the time was not far distant when the logic of the house would be honored by the ablest and best minds in England. It is interesting to note that in 1734 and in 1775 the right of the king to erect a court of chancery was warmly contested in England.

In June, 1719, Hunter bade adieu to New York, and carried with him to the old world substantial evidences of good-will and affection. The chief command of the province devolved on Peter Schuyler, the oldest member of the council, whose short administration of thirteen months was marked by few events of importance.

#### BURNET'S ADMINISTRATION—1720-'28.

Governor William Burnet, son of the celebrated prelate, Bishop Burnet, succeeded Hunter, assuming his executive duties September 20, 1720. His career in New York was without striking incident or conflict. He married a New York lady, and interested himself thoroughly in New York affairs. The most knotty question during his governorship was that of Indian affairs. The French were purchasing goods of the New York merchants and selling them to the red warriors. The profits of this commerce to the French were large, and it was feared

that through it they would obtain controlling influence over the Indians. A bill was drafted, and, after much opposition from the merchants, was passed into a law, forbidding the sale of such goods to the French, under severe penalties, as were merchantable to the Indians. It compelled the French to buy in Boston or directly from England at larger prices. The merchants thereby lost a lucrative trade, and in great wrath appealed to the lords of trade, who sustained the act. Burnet, having succeeded in his plans to prevent circuitous commerce, took immediate steps for direct intercourse with the Indians. He promised to establish an English settlement in their wild country, with which they were greatly pleased; and within a brief period fifty young men from the best families of New York city and Albany tramped through the wilderness to start a settlement, trade with the natives, and strengthen as far as possible their precarious friendship. In 1725 Bradford established the *New York Gazette*, and in 1729 a city library was founded, through the gift of 1,622 volumes and the addition of a small collection donated to the city in the beginning of the century. In 1728 Burnet was removed from the government of New York to that of Massachusetts and New Hampshire, where he died suddenly the following year.

#### MONTGOMERY'S ADMINISTRATION—1728-'31.

His successor in New York was John Montgomery, who was amiable and inactive, and without sufficient character to inspire opposition. He renewed the ancient covenant chain with the Indians with much ceremony, and he granted a new charter to the city with an increase of powers and privileges. New ships were built, new ferries established. The city was divided into 7 wards, and the first steps were taken to organize a fire department. Two fire-engines were ordered from London, and 24 able-bodied men were appointed to work them on necessary occasions. The same year a line of stages was established between New York and Philadelphia, performing the tedious journey once a fortnight. On the 1st of July, 1731, Governor Montgomery suddenly died. Until the arrival of his successor, the government was administered by Rip Van Dam, the oldest member of the council and its president.

#### COSBY'S ADMINISTRATION—1732-'36.

Colonel William Cosby reached New York as Montgomery's successor in the summer of 1732. He was quickly in a serious contention with President Van Dam about the division of the salary which the latter had received while occupying the governor's chair for the preceding thirteen months. Van Dam was willing to divide the salary if Cosby divided the perquisites received in England for pretended services, according to the king's order. The governor refused, and Van Dam not only refused to divide the salary, but demanded the balance due to him. Both parties instituted legal proceedings, and the whole community was excited with the contest. The cases were subsequently dropped without settlement, and Cosby never recovered any of the money. The quarrel created two violent parties, and one of its outgrowths was the famous Zenger trial. John Peter Zenger started a newspaper, calling it the *Weekly Journal*, and filled it with witticisms and low satire. He was encouraged and ably assisted by Lewis Morris, Rip Van Dam, William Smith, James Alexander, and other leading spirits, who were ready at any time to castigate the administration. Bradford was editing the *New York Gazette*, and replied to many of the remarkable statements in the *Weekly Journal*, but he was no match for his adversary. Governor Cosby was driven almost to madness. Zenger was finally arrested and imprisoned. His trial occupied a whole summer and attracted the attention of all America. Liberty of speech and freedom of the press were at stake, and the enemies of Cosby were untiring in their efforts to influence the popular mind against the tyranny and oppression of the proceedings. Zenger was acquitted, which was thought one of the greatest triumphs of the age, and the event has since been variously styled "the germ of American freedom", and "the morning star of that liberty which subsequently revolutionized America," etc. Writers of every grade took courage and became more audacious than ever.

The two great parties henceforward differed materially from those which had shaken New York in the past; both were loyal to the British Constitution, but one was conservative and the other radical. The religious element entered largely into politics, the Episcopalians and many of the Dutch being conservative and the remainder of the Dutch and the Presbyterians distinctly radical. On each side were wit, taste, ability, and stubborn resolution, and each had always some advantage over the other. The feud between Cosby and Van Dam widened as time rolled on. In the winter of 1736 Cosby found himself dangerously ill, and on his dying bed secretly suspended Van Dam that he might not as president of the council assume the government in case of his death. Cosby died March 10, and early next morning the council administered the oaths of office to George Clarke, the councilor next to Van Dam in the order of age, and before the suspension of Van Dam was made public. A storm of indignation ensued, and the citizens generally were in sympathy with the aggrieved Van Dam, who assailed the validity of the act, and refused to concede the right of Clarke to exercise authority. An insurrection at one time seemed imminent. Finally Clarke received a commission from the crown as lieutenant-governor, and order was once more restored.

It was seven years before a new governor arrived from England, and it was a period of perpetual agitations and hot disputes. The assembly was stiff and unyielding, and would grant only annual supplies to the government. The "Negro plot" made the year 1741 memorable in the history of the city.







## CLINTON'S ADMINISTRATION—1743-'52.

In 1743 Admiral George Clinton arrived—easy, good-natured, unambitious, and given somewhat to high living. The next year New York was involved in matters of vital importance. France had assumed a threatening attitude toward England, and the prospect of rebellion in Scotland called for active military preparations. The formal declaration of hostilities was known in New York in July; before September the savages at the north were on the war-path. Large sums were voted by the assembly for defenses. But when Clinton desired New York to join in the attack upon Louisburg, he was told that the conquest of Canada belonged exclusively to the crown. Clinton's speech to the house on the subject was not well received, and no address was vouchsafed him in return, which was contrary to all parliamentary usage. During the next eight years the governor and the assembly were in perpetual collision about the permanent revenue. He wrote to the lords of trade that it was astonishing how jealous the men of New York were of the power of the king—they picked flaws with every officer appointed by the crown, and gave them salaries or not, just as it suited their pleasure.

Chief Justice James De Lancey was the active head of the opposition. He was not a foreign invader seeking to enrich himself with the surplus earnings of the hard-working pioneers of the country, but a native-born citizen of enormous wealth. The people pinned their faith to his honesty, because he would have no possible motive for stealing the public money. He was a man of courage, sagacity, scholarship, good-nature, vivacity, and magnetic presence, one who could be haughty or condescending, irritable or gracious. Clinton said that De Lancey ruled the assembly; that the members were opinionated, with old feuds rankling in their blood, and much more likely to be led than ruled. The ministry resolved to make all orders of the king the highest law in America, and found New York unmanageable. Its refractory little parliament boldly voted an annual support in spite of Clinton's vigorous attempt at coercion, and nothing more; saying: "Governors are entire strangers to the people they are sent to govern \* \* \*; should the public money be left to their disposition, what can be expected but the grossest misapplication under various pretenses, which will never be wanting?" The chagrin of Clinton can better be imagined than described when a royal commission was sent to his care, appointing De Lancey lieutenant-governor of New York. He immediately wrote to the lords, begging, as a great favor, that he might be authorized to suppress this commission to De Lancey, whom he declared was in league with the assembly to encroach upon the prerogatives of the crown.

Bancroft says that no other colony was at this time tinctured with such fearlessness of monarchical power, and that "New York was the central point of political interest in English North America".

The spring of 1752 found Clinton ill and depressed from the effects of an intense cold winter, and from the problems of boundary jangles, political discourtesies, Indian depredations, and quarrels in his council, and impatient to return to England. Sir Danvers Osborne, a brother of the earl of Halifax, was appointed Clinton's successor, and arrived in October, 1752. When he publicly took the oath of office in the council chamber, Clinton was obliged to produce also the commission of De Lancey, so long suppressed; and when the procession moved, according to ancient usage, to the city hall in Wall street, to read the king's commission to the people, the crowd became riotous, and insulted Clinton to such a degree that he had to take refuge in the fort. De Lancey was cheered on every side. Osborne had been instructed to insist upon the permanent revenue, "solid, indefinite, and without limitation", and was advised by some of the counselors that no such scheme could ever be enforced. "Then what am I sent here for?" was his mournful reply. The next morning, within a week after his arrival, he hanged himself.

## DE LANCEY'S ADMINISTRATION—1752-'60.

Quietly and sadly Chief Justice De Lancey took the oath of lieutenant-governor. His was a most delicate position, and his tact and statesmanship were called into full service. He did not wish to appear inconsistent, for it was he who had advised the assembly again and again never to submit; and yet as an officer of the crown he must urge obedience with seeming sincerity. In his opening speech to the assembly his language was so well chosen that the ministry could take no exceptions and the members were unruffled, having confidence in the genius of a judge who had been the chief adviser of the method of raising and issuing the public money for so many years. Henceforward the annual bills were passed, and De Lancey withheld his assent from them, for form's sake, until 1756, receiving no salary during that period. He sent to the ministry all resolutions and addresses concerning the measure, and whenever he could with propriety, he urged Great Britain to concede to the wishes of New York. The ministry finally gave up the contest, and joyful New York acknowledged that the triumph was due solely to the master policy of the lieutenant-governor. Sir Charles Hardy was appointed governor in the spring of 1756, and communicated the pleasure of the lords to the assembly. He was an unlettered admiral, and as much out of his sphere in matters of state as Clinton. De Lancey continued to be the real commander-in-chief. The next year Hardy was made a rear-admiral in the contemplated naval expedition against Canada, and De Lancey continued in the supreme command of the province until his death in 1760. He was a ruler whose high purposes and wide experiences would have made him a leader of men in any generation and under any circumstances. He

was at once a zealous and faithful counselor of the crown, and a sympathetic and firm friend of the rights and liberties of the people. If the king could have had like advisers and the colonists like leaders in the struggles which broke out afresh shortly after the death of De Lancey, the rupture which culminated in 1776 might have been long avoided, for its causes could and would have been removed.

The chief events during the administration of De Lancey which left their impress upon later times were the celebrated congress of 1754 at Albany, to concert measures for the common safety against the French, the feud growing out of the controversy about the charter of King's (Columbia) college in 1754, leaving the De Lancey and Livingston families sworn foes in any matter of public or private interest for a long series of years; and the French war, which occupied the public mind from 1755 to 1763.

Dr. Cadwallader Colden, the senior counselor, administered the government of New York after De Lancey's death until the pleasure of the ministry should be ascertained. He presently received the appointment of lieutenant-governor, and about the same time Major General Monckton was commissioned governor; but the latter spent very little time in New York, and Colden, who was a conscientious servant of the crown, ruled the colony.

The Sandy Hook light-house, first illuminated for the benefit of mariners in May, 1763, was the result of a petition from the merchants, and of a lottery legalized by the assembly. The mayor of the city had endeavored in vain to secure the passage of a law prohibiting lotteries, and about the same time the opening of a theater in Beekman street, under the countenance of Lieutenant Governor Colden, caused a sensation, and the mayor tried to secure the passage of a law prohibiting all dramatic performances within the city limits. The corporation introduced lamps upon public lamp-posts at this juncture, to supersede suspended lanterns, hitherto the only means of lighting the city.

Meanwhile the scheme for taxing the colonies was maturing in England. Positive instructions reached all officers of the customs in America to enforce the acts of navigation. There had been no such energetic and conscientious interpretations of duty since the time of Lord Bellomont. In the spring of 1764 intelligence reached New York that the stamp act had been introduced into the house of commons. At that moment the spirit of resistance was stronger in New York than in any other colony. The merchants resented the obstacles thrown in the way of their business through the enforcement of the obsolete and, in their opinion, unjust laws, and the rich landholders pronounced arbitrary taxation to be absolutely irreconcilable with their rights as British subjects. The assembly, proud and impulsive, addressed a memorial to the house of commons, demanding a voice and a vote in the administration of public affairs.

On the 27th of February, 1765, the stamp act passed the house of commons, and on the 8th of March it passed the house of lords. It was to take effect on the first day of the following November. It was believed in England that the tax would be peaceably levied. Unless stamps were used, marriages would be null, notes of hand valueless, ships at sea prizes to the first captors, suits at law impossible, transfers of real estate invalid, inheritances irreclaimable.

Presently the organization known as the Sons of Liberty extended from Massachusetts to South Carolina. New York was the central point from which communications were sent to the different towns along the Atlantic seaboard. As the post-offices were controlled by the government, the utmost secrecy was necessary, and letters were carried by special messengers. The newspapers were filled with satire and covert threats, and a reprint of the stamp act was hawked through the streets of New York as the "folly of England and the ruin of America".

New York, being the headquarters of the standing army of Great Britain in America, was watched by the other colonies with peculiar interest. James McEvers, who had been appointed stamp-master for New York, was unwilling to take the stamps in custody on their arrival, and resigned. Lieutenant Governor Colden thereupon wrote to the ministry that he should fearlessly take measures to have the stamps distributed. In spite, however, of his vehement protests, and his warnings that the movement was illegal and unprecedented, the famous stamp-act congress assembled in the city hall in Wall street, on the 7th of October, and remained in session three weeks. Delegates were present from all the colonies, and a bold declaration of rights and grievances was adopted.

A ship bearing stamped paper for New York arrived in the harbor on the 23d of October, and the excitement was intense. The whole city as one man seemed resolved upon resistance. The vessels at the wharves lowered their colors in sign of grief. Posters appeared in public, threatening the first man who should distribute or use the odious stamp. Colden retired within the fort, determined to execute the law. On the evening before the memorable 1st of November, two hundred New York merchants signed the non-importation agreement which struck the first great blow at the trade and industry of Great Britain. The following evening a procession moved through the streets amid great excitement, bearing the effigy of Colden, and also one of the devil whispering in his ear. A bonfire was kindled in front of the fort, and the effigy, gallows, and the lieutenant-governor's chariot, and every movable thing which could be found in his stables and about the fort, were thrown upon the pile and consumed. The city was in an uproar until the 5th—the citizens threatening to storm the fort and seize the stamps. Quiet was on that day restored by the mayor, John Cruger, who possessed the entire confidence of the people. He proposed that the city corporation should take the stamps into custody, and the head of the province and the military commander-in-chief of the British army in America assented. The mayor and aldermen proceeded to the fort gate and received the packages, which were deposited in the city hall, and the crowd dispersed.

This surrender to the municipal government of the principal city in America was extremely humiliating to the ministry, and was frequently discussed during the stormy sessions of parliament in the winter following. On the morning of March 18, 1766, the king went in state to Westminster and gave his assent to the repeal of the stamp act. The news reached New York in May, and the assembly was petitioned to erect a statue to William Pitt.

In 1768 the chamber of commerce was established—the first mercantile society in America. John Cruger was the first president, Hugh Wallace vice-president, Elias Desbrosses treasurer, and Anthony Van Dam secretary. In 1770 the permanent existence of the institution was secured through a charter from the crown.

In 1770 the earl of Dunmore arrived as governor of New York, and occupied the executive chair about nine months, and was then removed to the government of Virginia. Sir William Tryon was his successor, in 1771, and governed New York until the breaking out of the Revolution.

The city was in comparative tranquillity from 1770 to 1773. The duty on tea had not been abolished, although the East India company had offered to pay double the amount of the revenue which would be derived from this import in America if parliament would decide to repeal the law. Its stock was depreciating in value, and it could not pay its annual debt to the British government, and asked for relief. Hence an act of parliament permitting the company to export its teas, duty free, in England, but not relinquishing the right to tax the colonies.

New York was disturbed from center to circumference upon hearing that tea-ships were on the ocean destined for her port. "The tea shall not be landed!" was the emphatic exclamation. A meeting was called at the city hall, in Wall street, on the 16th of December, 1773, and resolutions were adopted. The tea-ship "Nancy" did not appear until April, 1774, and was not permitted to land her cargo or make entry at the custom-house, but was sent back across the seas in the most public manner, all the bells in the city ringing for an hour, without a pause, to call the citizens to witness the departure of the captain to his vessel and her sailing through the Narrows.

A few weeks later the city was stricken with astonishment and indignation at the closing of the port of Boston. The bill was cried through the streets as a "barbarous murder", and riotous proceedings and burning effigies seriously alarmed the substantial inhabitants, who proceeded to choose a committee of control and correspondence, styled the "Fifty-one". This committee proposed a "congress of the colonies". The other provinces having assented, and Philadelphia being named as the place and September the time for the meeting, five delegates were nominated by the Fifty-one and elected by the people to represent New York in the first continental congress—three merchants, Philip Livingston, John Alsop, and Isaac Low, and two lawyers, James Duane and John Jay.

The Fifty-one, having accomplished the object of its existence, appointed a day for the freeholders of the city to elect a "committee of observation", numbering sixty, ostensibly to enforce in New York the non-importation act of the first memorable congress, and then disbanded.

The New York assembly wrangled over the question of appointing delegates to the second congress, and the question was finally decided in the negative by a majority of four. At this critical moment the committee of sixty was strictly enforcing non-importation, and, to test the real mind of New York about the action of the assembly, caused a poll to be taken throughout the city, and found that, against one hundred and sixty-three, eight hundred and twenty-five were in favor of choosing delegates.

Whereupon a convention was summoned, in which the counties co-operated with the city, and forty-five electors chose from among their ranks fourteen delegates. Colden was in despair. He wrote to the ministry:

It is not in the power of government to prevent such measures; they are supported by individuals in their private character, and do not come within the energy of the laws.

The day following the adjournment of the convention New York was aflame with excitement over the startling news of the battle of Lexington (April 19, 1775). The Sons of Liberty took possession of the city hall and armed themselves with the munitions it contained. Two ships about sailing for Boston were boarded and the cargoes unloaded, to the value of £80,000. All vessels about to sail for any English port were detained. The royal government was helpless. The people ruled.

A new committee of one hundred was chosen to control general affairs until a provincial congress could be elected, which congress assembled in New York city May 23, 1775.

This body was in a serious dilemma on June 24, intelligence having arrived that Washington would pass through the city on the 25th on his way to Boston to take chief command of the continental army, and also a message announcing the arrival of Governor Tryon from a voyage to Europe. The self-constituted authorities must pay honors to both, and yet it was far from desirable that the two distinguished officials should meet. Thus two committees were appointed, one of which waited at the ferry to welcome whichever dignitary should be foremost to land. Washington came first, and a gay procession escorted him through Broadway. Tryon entered the city about 8 o'clock in the evening, and was escorted to the residence of Hon. Hugh Wallace with much ceremony.

The New York congress was chosen for only six months, at the expiration of which time an election was held for its successor. Whenever the provincial congress adjourned, a committee of safety was delegated from its own members to manage affairs in the interim; thus a responsible body representing the people was at all times in session. One of the strongly marked features in the complicated machinery of this self-governing power was the special care taken by men in office not to assume more authority than had been distinctly delegated to them by the united voice of their constituents.

The city at this time had stretched itself in a northerly direction only to the vicinity of the present City Hall park. The North Dutch church in Fulton street, and the Brick church and Saint George chapel in Beekman street, were then on the very frontiers, so to speak. The two former were respectively six and seven years old. Sidewalks had reached Saint Paul's chapel. Broadway at that point was a pleasant country road. Handsome villas and fine farms were scattered over the island. The great business center of the town was Hanover square. The quarter nearest the fort was the court end, although many of the leading and fashionable families had built residences in Wall street. Shops and places of business were upon every street to some extent.

The impending invasion of the city by the British induced many of its inhabitants to seek asylums in the country. In January a detachment of militia took possession of New York, and in the spring the American army followed. Rigorous military rule was established, and no one was permitted to pass a sentry without the countersign—to be furnished on application to a brigade major. Any person known to hold communication with the British ships in the harbor was treated as an enemy. The city was alive with conspiracies real and imaginary, and a secret committee required all suspected Tories to appear and give security on oath that they would have nothing to do with any measure hostile to the union of the colonies. Neutrality was not tolerated; men were compelled to show their colors. It was unsafe to breathe a syllable against the American cause. Fortifications were constructed in and around the city, and barricades, chiefly of mahogany logs taken from West India cargoes, were thrown across the streets leading to the water; thus when the British should gain a footing in the city they would still have to contest every inch of progress.

The news of the action of the continental congress, at Philadelphia, on July 4, 1776, reached New York on the 9th, and the Declaration of Independence was read, by order of Washington, the same evening at the head of each brigade of the army in the city and vicinity; a jubilant multitude proceeded at once to the Bowling green and demolished the statue of George III. The newly elected assembly of New York met at White Plains the same day, where the declaration was also proclaimed, and a swift message was sent to the New York delegates at Philadelphia empowering them to vote, which consummated the complete union of the thirteen colonies. On the 18th independence was proclaimed from the city hall in Wall street in the most public manner and in the very face of the enemy's guns, and the king's coat-of-arms was brought from the court-room and burned amid thrilling cheers.

Meanwhile an attack was hourly expected, and Washington advised the removal of women, children, and infirm persons to places of safety. Thirty-seven British men-of-war and 400 transports, snugly anchored between Sandy Hook and Staten island, presented a bristling forest of masts. There seemed little to prevent their sailing up the Hudson and landing in the rear of the town. But the plan of reaching New York by way of Long Island prevailed, and on August 22 Great Britain's disciplined warriors landed near Gravesend. They did not push forward, however, as briskly as anticipated by the Americans. It was on the 27th that the battle of Long Island occurred, and on the night of the 29th that the famous retreat from Long Island was executed with profound secrecy—one of the most remarkable military events in history.

Some days elapsed before the enemy made further advance, fearful of precipitating the destruction of the richest city in America. Washington and his generals held a council of war September 7, and resolved to evacuate the city, since it could not be held in the presence of an army of such strength. On the 15th the British entered the East river and landed at Kip's bay, pursuing the American army on its retreat until evening. On the 16th the battle of Harlem Heights gave to the enemy new ideas of American valor, and to the patriots fresh courage and confidence. On the 21st a destructive conflagration consumed an eighth part of the city, destroying 492 houses.

On the 17th of October Washington moved his army toward the strong grounds in the upper part of Westchester county, and on the 18th the whole British army was in motion in the same direction. These two armies traveled nearly abreast for several days, both being deficient in the means of transportation, and the British hindered by the loss of bridges and by finding stone walls and felled trees athwart the roads. At White Plains, on the 28th, there was an engagement with no important results. On the 5th of November the British suddenly retraced their steps toward the city. On the 16th fort Washington was attacked and the American garrison surrendered. Thus Manhattan island was left in complete possession of the British, and so continued for eight years.

During its occupation by the British army the city was under military rule, its courts of justice were closed, prisoners of war were confined by thousands in its churches, sugar-houses, and ships, and no attempt was made to remove the ruins of its great conflagrations. The second disastrous conflagration occurred in August, 1778, when sixty-three houses and a number of stores were consumed. The winter of 1779-'80 was one of excessive cold, with deep snows, and the inhabitants were distressed for firewood to such a degree that nearly all the beautiful shade-trees and fruit-trees in the city were sacrificed. The bay was frozen over to Staten island, and the men-of-war at anchor in the harbor were immovably ice-bound.

The news of peace brought, instead of joy to New York, anguish indescribable. The loyalists, who must go into permanent exile or be hanged, as they believed, were in the depths of sorrow and despair. Many were obliged to abandon large estates, and angry lamentations filled the air.

Sir Guy Carleton, the British commander, notified Washington that he should be ready for the final evacuation of New York on the 25th of November, 1783. The ceremonies were arranged for the day, and as the rear guard of the British army began to embark, the formal entry of the American army into the city was witnessed by thousands.





Nearly all the public buildings were in a battered and damaged condition. The *débris* of army life was scattered from one end of the town to the other, trade was ruined, and the city treasury was empty. James Duane was the mayor chosen to bring order out of chaos, and a more resolute and efficient public-spirited officer could hardly have been found. The mayor's court, under his administration, became an important forum. The legislature of the newly created state of New York assembled in the city in January, 1784. But the adjustment of public concerns was constantly retarded by the dead-lock in private affairs. The rigid laws enacted by the state during the war were now sharply contested by citizens who claimed to have been living on private estates "peaceably", in itself no "treason", and the confiscation of property under such circumstances was declared contrary to all usages of civilized nations. Extraordinary debates, ending in quarrels, were of daily occurrence. Old feuds were revived, and party lines strongly defined.

### PROGRESS.

Business revived slowly; the chamber of commerce was reorganized in the spring, the university of the state was created by an act of the legislature in May, and Columbia college was opened once more. The press was in a formative state, and was managed chiefly by ambitious political chiefs as armies are manipulated by their generals. The population of the city was a mixed grouping of nationalities, not exceeding 24,000. Public whipping was still in vogue for various misdemeanors, and negro slaves were numerous.

Before the end of 1784 New York was thrilled with the intelligence that the national congress was about to take its seat within her borders. This was an event greatly to be desired, and the corporation was not slow in tendering the city hall for its use. A sudden, strong, healthful impetus was given to industries of all kinds, and a new era of prosperity dawned upon the city. On the 23d of December, 1785, Congress met, and henceforward, for six years, New York was the capital of the nation. Wall street became the great center of interest, as well as the fashionable promenade.

John Jay was the newly appointed secretary of foreign affairs (Chancellor Robert R. Livingston having retired from the office in 1783), and he proceeded to establish a system of harmonious intercourse with the various powers of the old world. Alexander Hamilton took up his abode in Wall street. When the subject of the formation of a constitution for the infant republic agitated public attention he stepped into the arena, and his genius, eloquence, and force of will were among the most potent influences which accomplished the great result. On the 26th of July, 1788, New York adopted the new constitution, and a celebration of extraordinary magnitude followed.

There was but one mind in the choice of President. The new Congress under the constitution assembled for business on the 6th of April and counted the presidential votes. Washington had received every one. As soon as the necessary arrangements could be made, he was inaugurated President of the United States. The ceremony took place April 30, 1789, on the balcony of the old Federal hall fronting Broad street, and Chancellor Livingston administered the oaths. This building had been enlarged and beautified at a considerable cost, in contemplation of the event. It was here during the next twelve months that some of the most complex, intricate, and important subjects were discussed that ever came before a body of legislators. The political machinery of the new government was here tried and set in motion, and the principles upon which alone it could survive were here determined. The departments of state, of the treasury, and of war were established, and all initiatory questions of interpretation settled. And it was here that Hamilton, as the first Secretary of the Treasury, matured his scheme for funding the great national debt—the effect of which upon the prosperity of the country was magical. The first President exercised daily on horseback, walked about the city at his pleasure, drove every pleasant morning with Mrs. Washington and others, sometimes in the post-chaise and sometimes in the chariot, and he usually visited Congress in Wall street in a coach drawn by six handsome horses, with outriders in livery, and two gentlemen on horseback preceding and two following the equipage.

When Congress adjourned on the 12th of August, 1791, it was to meet in Philadelphia in December, it having been decided to remove the seat of government to that city for ten years, and permanently to the site of the present city of Washington, on the Potomac. President Washington's final farewell to New York as a place of residence was on the 30th of August, 1791.

The merchants of New York formed the Tontine association, whose object was to provide a business center for the commercial community, and erected a building in Wall street in 1792. The city soon became the refuge of the French exiles, and was greatly disturbed by irregularities attending the French revolution. The two political parties of New York grew more violent in their opposition to each other as conflicting interests multiplied. Presently peace or war with England was discussed with much irritation.

In April, 1794, Chief Justice John Jay was appointed envoy extraordinary to the British court, and sailed for England on the 12th of May. He was absent about a year, and negotiated a treaty with England which created a great stir and commotion throughout the Union, and which has ever since been known as the Jay treaty. In the midst of the political excitement of the summer of 1795 the yellow fever broke out in the city, and, notwithstanding great numbers of the citizens fled to country places, 730 deaths occurred.

The population of the city nearly doubled during the decade between 1786 and 1796. In the summer of the last-named year Fresh Water pond (the site of the tombs) was the scene of the trial of a steamboat with a screw-propeller, the invention of John Fitch.



Before the century closed the greater portion of the district burned during the Revolution had been rebuilt, some of the streets widened, nearly all of them straightened and raised in the middle, and sidewalks generally constructed on both sides. The most elegant mansion in the city at this date was that erected on the site of the old fort, opposite Bowling green, in 1794, for a presidential residence had the seat of government remained in New York. It was occupied as a residence by the governors of the state for a few years. The number of churches in the city was 23; the number of markets, 5. The Park theater was erected in 1797, and first opened in 1798. The yellow fever visited New York again in 1798, and the number of deaths registered was 2,086. Water hitherto had been supplied to the city from wells. In 1799 the Manhattan Company was chartered, ostensibly to supply New York with good water, and the Bronx river was proposed as the source of supply, and was surveyed. But the real purpose of the movement was to establish a bank in New York. The Bank of New York, virtually founded by Hamilton in 1784, and chartered by the state legislature in 1791, was the only banking institution in the city up to this time. Aaron Burr had determined to found a bank for his political party that should rival the Bank of New York, and succeeded. The Manhattan Bank was duly organized and went into operation.

In 1801 the total valuation of the real and personal estate of the city and county was \$21,964,037, and a tax was laid of 1 mill on the dollar. The population of the city was about 60,000. In 1802 the New York *Evening Post* was founded. The other leading newspapers were the *American Citizen* and the *Morning Chronicle*. In 1803 the corner-stone of the present city hall was laid by the mayor, Edward Livingston. There was an appalling visitation of the yellow fever during the same summer, creating general consternation throughout the city.

June 11, 1804, Alexander Hamilton fell in a duel with Aaron Burr.

In the autumn of the same year the New York Historical society was founded, with Judge Egbert Benson as its first president. In 1805 the New York Free School society was incorporated, and one school was established. In 1825 that one free school had increased to six. In 1806 a medical society was incorporated to regulate the practice of medicine and surgery in the state.

The year 1807 was rendered memorable in New York's history by Robert Fulton's successful experiment in steam navigation on the Hudson river. The same year a commission was appointed, consisting of Gouverneur Morris, Simeon De Witt, and John Rutherford, to survey and lay out the whole island of Manhattan to Kingsbridge into streets and avenues. At this juncture New York contained thirty-one strictly philanthropic institutions, also nineteen newspapers, of which eight were dailies, together with several monthly and occasional publications. In 1808 the American Academy of Fine Arts was incorporated by act of the legislature.

In 1811 the city was visited by a terrible conflagration, and between eighty and one hundred good buildings were consumed. Public attention at this period was divided between the aggressions of Great Britain and the project of the Erie canal. In June, 1812, war was declared by the United States against Great Britain. New York, through individual enterprise, fitted out and sent twenty-six privateers from her port within four months, and others followed, which became the terror of British traders upon the ocean until peace was restored. New York also sent her ship-carpenters to construct fleets upon the great lakes, for the purpose of driving the enemy from inland waters. The situation of the city at this crisis was disquieting in the extreme. On one of the last days of the year 1812 it was determined in British council to destroy the great centers of American commercial and naval powers. Presently the harbor of New York was blockaded by the war ships of the angry foe. It was well known that no other city on the continent was so much the object of British enterprise and ambition as New York.

The most serious alarm which the city experienced, however, was in the summer of 1814, when the secret intelligence was received of a premeditated attack, and a powerful British force appeared at about the same time in the Chesapeake, as if to confirm the report. The citizens of every class rallied to the work of strengthening the defenses, nearly all the young and military men having gone to the protection of the frontiers of the state.

Three thousand persons were quickly laboring with pick-axes, shovels, and spades. Masonic and other societies went in bodies to the task. Butchers and weavers and carpenters left their business and marched in procession each morning. School-teachers and their pupils went together, and, in some instances, pastors and their congregations. On the 15th of August the city newspapers were suspended, that all hands might help on the fortifications.

On the 27th tidings came of the burning of Washington, and thousands hitherto indifferent were aroused to action. It was determined to preserve New York at all hazards, and the city and its suburbs became one vast military camp. A community of soldiers seemed suddenly to have sprung into existence. Men of all ages and callings filled the ranks—the old merchants paraded in the drill alongside the young boot-black, the gentleman of leisure and his barber, the rich magnate and the tired mechanic. The scarcity of specie and the drain upon the banks caused a suspension of specie payments on the 31st, which continued until July, 1817. The pressure for funds was so great that the Secretary of the Treasury issued stock as well as treasury notes, with which to borrow currency; but the New York banks refused to loan without additional security, and Governor Tompkins finally indorsed them on his own personal and official security, and a half-million was promptly loaned.

The autumn was one of feverish dread. The heights around Brooklyn were crowned with military works, completely isolating the town. Harlem heights were fortified on all points. Fort Richmond was built at the Narrows, and the works on Governor's and Bedlow's islands were enlarged and strengthened. Castle garden was erected at the foot of Broadway, and numerous other strongholds were provided on both sides of the island.



# NEW YORK.

Map showing growth of City from  
date of first Settlement to 1836.

First Settlement.....	a	
Extension of City in 1642....	b	
" " 1661....	c	
" " 1695....	d	
" " 1723....	e	
" " 1755....	f	
" " 1767....	g	
" " 1789....	h	
" " 1797....	i	
" " 1808....	j	
" " 1817....	k	
" " 1836....	l	

On the 24th of December, 1814, a treaty of peace was signed between the two belligerent nations, and on February 11, 1815, the news reached New York, and the whole city was in a delirium of joy.

### PROSPERITY.

The population of New York at the close of the war was a fraction over 92,000, inclusive of nearly 1,000 negro slaves. Public improvements of every description had been interrupted and neglected during the conflict, but the city was still wealthy from the fruits of her wonderful progress since the Revolution. Business presently revived with a new impulse, the hum of industry was heard on all sides, and commerce prepared for flight to every quarter of the globe. The genius and enterprise of all America poured in, and the city took a marvelous leap forward in her glad career of prosperity.

One of the first questions of moment that agitated New York was that of inland navigation. The Erie Canal project was pushed forward with vigor and discretion, and finally the work began. Meanwhile its master-spirit, De Witt Clinton, as mayor of the city, was conspicuous for the energy with which he pushed forward the work of opening new streets. Beginning July 4, 1817, eight and one-third years were occupied in building the famous canal—the longest in the world—the manual labor not ceasing for a day, the cost borne by New York amounting to nearly ten millions of dollars, and during the same period the amount collected in the New York custom-house and paid into the treasury of the nation for duties of import and tonnage was upward of sixty-four millions of dollars.

In 1822 the yellow fever appeared again in the city, and raged with great fury. Business was entirely suspended during August and a part of September, and high board fences inclosed all the infected streets and districts below the city hall. The banks, insurance offices, etc., were removed to Greenwich village until the ravages of the pestilence ceased. In 1824 Lafayette arrived in the city as the guest of the nation, and was received with a public celebration of exceptional magnitude.

On the 26th of October, 1825, the Erie canal was completed, and a celebration was planned on a grand scale for the 4th of November following. The waters of lake Erie were admitted to the canal on the 26th of October, and the news was signaled to New York city in an hour and thirty minutes by the discharge of cannon posted at intervals along the route. New York replied to Buffalo in the same manner, the sound occupying a similar length of time in passing through the air to Buffalo. Canal-boats immediately started freighted with distinguished passengers, reaching the metropolis on the day appointed, November 4. An aquatic procession, such as the western continent had never before witnessed, conducted the pioneer canal-boat to the ocean, and formed a circle around it of some 3 miles in circumference. De Witt Clinton, standing in full view of the assembled multitude, lifted an elegant little keg of lake Erie water high in the air and poured its contents into the briny deep, as a typical illustration of the union of our mediterranean seas with the great water highways of the globe. The corporation of New York prepared and sent to Buffalo by the returning canal-boat a keg of water from the Atlantic. Thomas Jefferson said of the canal: "This great river will immortalize the authorities of New York, and bless their descendants with wealth and prosperity." And his prophecy was speedily fulfilled.

### MODERN NEW YORK.

Gas was introduced into the city in 1825. The surface extension of the city in a northerly direction was rapid, and presently the daring schemes of architects in building edifices seven and eight stories in height, where the land was costly, excited little wonder. The rise of churches and institutions of every character kept pace with the development of those already established, and with the general extension of the rapidly growing city.

In 1831 the population had reached upward of 200,000. Stages had hitherto been the only means of public conveyance from one point to another. This year was made notable by the beginning of a horse-railroad from the central part of the city to Harlem, which was completed in 1833. In 1832 the Asiatic cholera ravaged the city, and over three thousand persons died from the terrible scourge.

The first election of a mayor of New York by the votes of the people was in 1834, the successful candidate being Cornelius W. Lawrence. It was a year of disturbances and riots through opposition to the anti-slavery movement.

The year 1835 was signalized by a terrible and disastrous conflagration which destroyed nearly seven hundred buildings, occupied chiefly by New York's largest shipping and wholesale dry-goods merchants and grocers. The burnt district embraced some 13 acres, and the property destroyed was estimated at upward of \$20,000,000. The fire had been the direct result of a water famine, and a sense of the perishing condition of the city for water at once took possession of the public mind. Close upon New York's calamity followed the commercial distress which resulted in the great financial panic of 1837. Business men could not pay their debts. On the 10th of May all the banks in New York suspended specie payments. The storm swept over the whole country, and countless prosperous firms disappeared from public view. Through the personal influence and efforts of James King, coin was obtained from England, and the New York banks were able to resume specie payments in 1838 and to smooth the way for the other banks of the country to resume.

The Croton aqueduct was the great achievement of the decade from 1835 to 1845. It cost upward of \$9,000,000, and was erected during a period of unprecedented commercial embarrassment and in the face of vast natural obstacles. On the 4th of July, 1842, it was so nearly completed that the water was admitted to the city, and the event was celebrated with an imposing military and civic pageant 7 miles in length. The health and comfort of the city was assured by this colossal and beneficent movement of the enterprise and foresight of its citizens. The foundation of the great newspaper system of New York belongs to this decade. The *New York Sun*, the first successful "penny paper" in the world, was projected in 1833. When two years old it boasted a circulation of eight thousand. One cent continued to be its price for thirty years. The *New York Herald* was founded in 1835; in 1836 the price was raised to two cents. The *New York Express* was first issued in 1836, the *New York Tribune* in 1841, the *New York Times* dates from 1851, and the *New York World* from 1860. The older and "blanket-sheets" of the period were the *Journal of Commerce*, founded in 1827, and the *Courier and Enquirer*, which in 1861 was merged in the *World*. Of religious weekly papers, the *New York Observer* dates from 1823, the *Christian Intelligencer* from 1823, and the *New York Evangelist* from 1833. The magnetic telegraph, with all its wonder-working properties, was struggling for recognition and usefulness during this same period of intellectual unrest. Professor Morse studied and experimented until, in 1835, he was able to stretch half a mile of wire about his apartment in the New York University building, and to exhibit a magnetic telegraph in actual operation, but sending messages in only one direction. In 1844 he had succeeded in the construction of a magnetic telegraph between Washington and Baltimore, and in 1845 one was opened between New York and Philadelphia.

In July, 1845, another disastrous fire destroyed three hundred and forty-five buildings in the business part of the city below Wall street, and property amounting to several millions. At this date but few scattering buildings were seen from Union square looking north, but many wealthy citizens had Fourteenth street as a place of residence, and it was soon filled with costly mansions and became the fashionable part of the city.

War with Mexico and the discovery of gold in California affected New York seriously in 1849, drawing men from their business and their families in great numbers. The year was also made memorable by the Astor Place riot, springing from a quarrel between theatrical partisans. It cost several lives, and was quelled only by the interference of the militia. At the opening of the legislature of 1849, Governor Hamilton Fish announced the bequest of John Jacob Astor of \$400,000 for the foundation of the Astor library, and recommended the necessary legislation for giving validity to the munificent donation. The library building was located in Lafayette place and was completed in 1853.

The building of the Crystal palace on Murray hill and the opening of the World's fair in the summer was the sensation of 1853. This beautiful "house of glass" was afterward consumed by fire. The march of brownstone in Fifth avenue, north of Madison square, dates from the completion of the Madison Square Presbyterian church in 1854. The year 1856 was marked by the purchase of the site of Central park, at a cost of nearly five and one-half million dollars.

The summer of 1857 was one of general financial disaster. New York, as the great commercial center of the nation, was the first to suffer, and the tempest spread with devastating fury over the commercial world of both hemispheres. The business of the city was suspended. Nine hundred and eighty-five failures were chronicled among the merchants before the end of December. Enterprises of every description were at a standstill, and industries were paralyzed. The working-classes were thrown into a state of the most alarming destitution, to which a cold winter added fresh terrors. The city corporation distributed food, and, as far as practicable, furnished labor on the Central park and other public works. In one district alone 10,000 persons were fed one December day by public and private charity; few of these were American-born. Aid could not reach all, and many perished. Riots and disturbances occurred; the hungry crowd seized bakers' wagons and threatened to break open provision stores and help themselves. United States troops were placed in charge of the arsenal and of the custom-house and assay office. With the coming of spring business slowly revived, the New York banks having taken the initiative in resumption.

In August, 1858, the successful laying of the Atlantic cable was announced, and New York city, where the idea had been conceived of uniting Europe and America, celebrated the event in the most enthusiastic manner. The illumination and fireworks in the evening ended unfortunately, for the city hall took fire and was badly injured.

The political controversies of the winter of 1860-'61 arrested business. The attack upon fort Sumter in April stirred New York like an electric shock. The spirit of the people was demonstrated by an uprising which influenced the whole country. Men of all classes offered their personal services with alacrity. Once more the city seemed peopled by a race of soldiers. A meeting in Union square on the 20th of April exceeded in magnitude and enthusiasm any public assemblage in the country. The work of organizing regiments was at once undertaken. The city authorized a loan of \$1,000,000 for the defense of the Union. The New York bar pledged \$25,000, and the banks enormous sums. Foremost in the field was the gallant Seventh regiment, and its departure for the war was almost like a triumphal procession.

Other regiments were quickly on the way. The mayor of the city, in his annual message in January, 1863, stated that the people of New York had furnished over 80,000 volunteers, and contributed, in taxes, gratuities, and

loans to the government since the beginning of the war, not less than \$300,000,000. The banks, after having loaned \$15,000,000 in coin to the government, suspended specie payments. During each year of the war large out-of-door meetings were held, of which those in Union square, of July 15, 1862, and April 11, 1863, were the most conspicuous. Numberless associations were formed for the relief of soldiers, and the ladies of the city were at work by thousands.

In the beginning of the year 1863 the emancipation proclamation and the project of arming the slaves aroused the bitterest opposition. Then came the conscription law, and finally the presidential order of a draft of 300,000 men. The authorities attempted to enforce the draft in New York, which caused a terrible insurrection. For three days and three nights the mob maintained a reign of terror, sacking houses, attacking the police, and hanging every negro who appeared on the streets. All business was suspended, street-cars and stages were stopped, and residences in many parts of the city were fortified. The Secretary of War ordered home regiments of soldiers doing duty elsewhere, but before they arrived the climax of atrocities had been checked by the combined action of the police and the citizens, together with the slender military force at the disposal of the authorities.

In 1865 the assassination of President Lincoln turned extensive preparations for the celebration of peace into funeral obsequies. The body of the President was brought to the city *en route* for the West, and lay in state in the city hall, where it was visited by a continuous stream of mourning citizens. On the 25th of April it was escorted to the Hudson River depot by an enormous and imposing procession, through streets densely lined with sorrowing spectators. Such a spectacle had never been witnessed on this continent.

The "Black Friday" gold panic of 1869 was an event which left its impress upon every part of the country, and the complications arising out of the operations of that terrible day were not adjusted until six or eight years afterward. The machinery of the gold clearing-house broke down, fortunes melted away in a moment, and such was the excitement in Wall street that riots were anticipated. Large bodies of policemen appeared upon the scene, and a military force was held in readiness to march upon Wall street at any moment. This calamity was followed by many disasters at the stock exchange.

The Chicago fire in 1871 caused the decrease of some \$200,000,000 in the market value of securities, which resulted in numerous failures. The Boston fire followed the next year, and its consequences were severely felt in Wall street.

The year 1872 will be recorded in all future history as the epoch wherein the citizens of New York, of both political parties, combined against the public plunderers who had for years controlled the city government. A committee of seventy was appointed to bring the guilty to justice. Arrests, trials, and imprisonments followed, and the world witnessed the exposure of one of the most remarkable conspiracies ever aimed at municipal integrity.

In the midst of these excitements came the panic of 1873, precipitated through the discovery of unsoundness in one or two leading banking-houses, but caused chiefly by excessive outlays of capital in unprofitable railroad construction. This panic probably surpassed all others known to this country in duration, intensity, and destructiveness. The stock-exchange board was closed for ten days, during which period all dealings were irregularly effected in the streets. The life-blood of trade was so nearly wanting that 1 per cent. per diem was often paid for the use of large sums of money.

The New York clearing-house, first established in the city in 1853, and which embraces in its association the principal banking institutions, inclusive of the sub-treasury, proved itself an arm of strength in the emergency, and greatly modified the serious results of the monetary disturbances.

No more conspicuous example of the marvelous development of New York within the century can be presented than its surface extension from the city hall to the Harlem river. An almost continuous city from these two points, on the east side of Manhattan island, may be seen, while on the western borders broad and costly boulevards are rapidly being improved on either side by handsome dwellings.

The herculean project of erecting elevated railroads through the streets of the city came to a successful termination in 1878. It was opposed at every step; horse-railroad companies and property-holders brought suits and laid injunctions at every move. Charters were declared unconstitutional, and cases were carried from tribunal to tribunal. The community cried out in anguish that the noise would kill business, the unsightly objects destroy the beauty of the city, and the moving of trains in the air frighten horses and endanger human lives. Neither the Erie canal nor the Croton aqueduct encountered more fierce and determined opposition. But within a year from their first opening it is doubtful whether an almost equally serious battle would not have been the result of trying to deprive the city of the new element of convenience and prosperity.

## NEW YORK IN 1880.

## LOCATION.

New York, the chief city and the center of the commercial metropolis of the United States, is situated in the extreme southern part of the state of New York, at the confluence of the North or Hudson river with the waters of Long Island sound, familiarly known as the East river, and 18 miles from the Atlantic ocean at Sandy Hook. The geographical position of the city hall is  $40^{\circ} 42'$  north latitude, and longitude  $74^{\circ}$  west from Greenwich. The principal portion of the city is on Manhattan island, the lowest point of which is on a level with the sea, while the highest point, at fort Washington, is 271 feet above sea-level. In the district north of Manhattan island, and within the corporate limits, the highest point is at Riverdale, where an elevation of 282 feet above sea-level is reached.

Manhattan island is bounded on the north and east by the Spuyten Duyvil creek and Harlem river, on the east and south by the East river, and on the west by the Hudson river. A straight line drawn between its extremities would point by the compass north-northeast and south-southwest. That part of the city which is on the mainland, known as the 23d and 24th wards, has the same general direction as Manhattan island, and is bounded on the north by the Yonkers City line, on the east by the Bronx river, on the south by the East river and Harlem kills, and on the west by the Harlem river, Spuyten Duyvil creek, and Hudson river.

In addition to the above the corporate limits include Blackwell's, Ward's, Randall's, and Hart's islands.

## HARBOR AND WATER-COURSES.

New York has harbor facilities not excelled by those of any city in the world, being surrounded on three sides by water navigable for the largest ships, the East and Hudson rivers having a depth of 40 feet. The principal approach to the city from the ocean is east of Sandy Hook, a long spit of sand making out from the New Jersey coast, and up the Narrows, between Staten island and Long Island. The bar at Sandy Hook is 18 miles from the city, and has two ship-channels from 21 to 32 feet in depth at low tide and from 28 to 39 feet at high tide. Vessels of the heaviest draught pass the bar, but their passage is generally made with reference to high water.

The harbor of New York may be considered in two parts, viz, the Upper and the Lower bay. The latter, between the Narrows and Sandy Hook, is of a general triangular form, from 9 to 12 miles on each side, with an area of 88 square miles, and affords a safe anchorage. To the westward it becomes Raritan bay, and from this direction is approached by vessels coming through the Staten Island kills. Above the Narrows the Upper bay, or what is generally known as the harbor of New York, widens out. It is of an oval, irregular shape, between 8 and 5 miles in length and width, with an area of about 30 square miles. In addition to the Upper bay the Hudson and East rivers afford 13 square miles of good anchorage adjacent to the city. The bottoms both of the Upper bay and of the rivers give firm holding-ground, while the strong tidal currents generally prevent the accumulation of ice. The water-front of the city is 44 miles, part of which (25 miles) is occupied by wharves mostly built of wood, with ample depth of water for the largest vessels.

The East river, between the city and Long Island, is merely a strait, 18 miles long, which connects the waters of Long Island sound with those of New York bay. It is also connected with the Hudson river by means of the narrow channel (Harlem river and Spuyten Duyvil creek) which separates Manhattan island from the mainland. The East river has a rapid tidal current and is navigable for vessels of the largest size. It contains several islands, and a pass known as Hell Gate, 7 miles from the bay, where navigation is more or less obstructed. When extensive improvements now in progress here, at the expense of the general government, are completed, the largest ocean steamers can come to the wharves of the city by way of Long Island sound. The Hudson river, here a broad, deep stream, flows between New York and Jersey City.

The tidal current separating Manhattan island from the mainland, known under the general name of Harlem river, consists of the Harlem river proper and Spuyten Duyvil creek, the latter name applying to the narrow, crooked portion of the westerly end, for a distance of  $1\frac{1}{2}$  mile, or from Kingsbridge to the Hudson river. The Harlem river is  $7\frac{1}{2}$  miles long, measuring from its entrance into the East river at the south end of Ward's island, making the whole length of the channel from river to river  $8\frac{1}{2}$  miles. The length as the channel winds is 2 miles more than by a straight line. A stretch of about  $1\frac{1}{2}$  mile in the vicinity of Kingsbridge is not navigable, by reason of a broad reef of limestone rock rising here in the bed of the stream to about low-water mark. Two bridges cross this part of the channel. The remainder of the stream is considered navigable, the depth, however, being only sufficient at low tide to float vessels drawing 3 or 4 feet in Spuyten Duyvil creek, and 5 to 7 feet in  $3\frac{1}{2}$  miles of the upper portion of the Harlem river. The distance from Spuyten Duyvil creek on the Hudson river, around by the Battery and the East river, to Harlem river is 22 miles. It is intended so to improve this channel that vessels can pass from the Hudson river directly to the sound, thereby saving  $13\frac{1}{2}$  miles.



## THE ACTION OF THE TIDES IN NEW YORK HARBOR.

New York harbor has two communications with the sea—one at Sandy Hook and one through Long Island sound. These differ essentially in their manner of influencing the water-level of the harbor and its currents. The opening at Sandy Hook is through and over constantly shifting banks of sand, the water-way being maintained by its own requirement for a channel of a certain sectional area, the varying deposition of sand and silt causing frequent changes in its sectional form. The channel from Long Island sound—the East river—being through a rocky channel, is practically uniform.

The inward flow of the tide at Sandy Hook is regulated by the rise of the tides in the ocean outside of the entrance. The inward flow through the East river is proportioned, not to the height of the tide in the ocean at the easterly end of Long Island sound, but to the considerably increased height of the tide as it arrives at the westerly end of the sound, the increase being due to the narrowing of the water-way as the shores of Long Island on one side and of Connecticut and Westchester county on the other approach each other. This increase of height, though less in degree, is similar in kind to that of the bay of Fundy. The height of the sound tide at Throg's Neck varies greatly with the spring and neap tides, and also according to the direction and force of the winds, strong easterly or northeasterly gales increasing the height, westerly and southwesterly gales decreasing it.

Were the high tide at Throg's Neck to coincide in time with the high tide reaching that point from Sandy Hook, the problem presented would be greatly simplified, and the influence of the tidal-wave from the sound on the waters of the harbor, though still considerable, would be less than it actually is. Owing to the long course of the tidal-wave and to the narrowing of the channel from Montauk point to Throg's Neck, high tide reaches the latter point from three to four hours after the high tide coming from Sandy Hook.

The tide is at its height at the eastern end of the sound and at Sandy Hook at about the same time—about seven hours after the moon passes the meridian. The tide entering at Sandy Hook is spread out over a large area in the lower bay; much of it is taken up by the Hudson, and its inward course through the East river and Hell Gate is slow, causing it to lose much of its height and speed. It arrives at Throg's Neck only about four hours in advance of the sound tide, and, of course, has fallen for four hours when high water reaches that point through the sound.

The height of the mean tide at Sandy Hook is about 4 feet, while at Throg's Neck, owing to the funnel-like form of the water-way, the sound tide reaches a mean height of about 7 feet. Were a barrier built across the East river at Hell Gate, there would be a difference of elevation of the water on its two sides, at certain stages of the tide, of about 5 feet.

Owing to the action above-indicated—the difference of time and of elevation of the two tides—the flow does not change direction at the time of highest and lowest water, as is ordinarily the case. When the tide coming through the harbor is at its highest point at Hell Gate, the sound tide, although rising, is still four hours from its highest level, and is consequently lower than the harbor tide, which overflows it and sets the current outward toward the sound. At this time the actual elevation of the water at Hell Gate is not great. The sound tide soon rises and becomes higher than the harbor tide. It then overcomes it and flows out in the natural direction of an ebbing harbor tide. The water at Hell Gate is now rising continuously to the greater height of the increasing sound tide, and the flow continues toward the harbor even after the highest point has been reached at Hell Gate, and after the sound tide has begun to fall. It still continues until the harbor tide in returning can again master the subsiding flow of the sound tide and set it towards the east. As the flow into the harbor through Hell Gate begins some time before high water, and continues some time after high water at that point, and as the flow toward the harbor is maintained during the upper part of the oscillation, when the volume of the current is greatest, the amount discharged into the harbor at each tide is greatly in excess of the return flow to the sound. The additional volume thus contributed to the waters of the harbor tends to raise the level not only of the East river, but of the North river, and of the lower bay as well. This increases the outward flow at Sandy Hook, maintaining a depth or sectional area of channel at that point greater than would be caused by the mere return of the tide entering there. It is a further important office of this addition to what might be called the natural waters of the harbor to increase the tide, and consequently the volume and cleansing effect of the flow of the Hudson river. Incidentally, also, the preponderance of the flow along the eastern shore of the city, being in the direction of the harbor, there is a tendency to sweep away to a safe point much of the foul matter which, if the East river were only an estuary, would be carried back and forth in front of the wharves. This flood being so abundantly poured in at Hell Gate, the harbor is subjected to a cleansing circulation, and to a relatively complete renewal of its water.

The investigation as to the movement of the tides of New York harbor was made by Mr. Henry Mitchell, chief of Physical Hydrography, United States Coast Survey, as shown in the report for 1867. The following are the concluding paragraphs of Mr. Mitchell's report:

We observe that during most of the period of rising tide in the harbor the current is flowing in from the sea at Sandy Hook and out into the sound at Hell Gate, and during most of the falling tide it pursues the reverse course. The pilots, therefore, call the inflow from the sound "*ebb*" and the outflow "*flood*". I do not use these terms, because they are not correctly applied, and are calculated to mislead, as will be apparent on closer inspection of our diagram.

During the first hour after the moon's transit (and while the tide is falling over our entire field), a continuous current flows from Long Island sound, by way of Throg's Neck, Hell Gate, and the East river, through the upper into the lower harbor, and out to sea over the bar at Sandy Hook.

During the second hour after the moon's transit, this continuous stream still prevails, except near Sand's point, where the easterly (ebb) current of the sound prevails. The neighborhood of the Stepping Stones is at this time the scene of a separation of two grand streams from a summit.

During the third hour, the summit is at Throg's Neck, and from this point a stream flows eastwardly through the sound, and another stream, taking the opposite direction, flows through New York harbor. Both are continuous, in opposite directions to the ocean, in which the tide has commenced to rise rapidly.

During the fourth hour after transit, the streams are broken up through Hell Gate, and Raritan bay is receiving supplies of water from the Hudson river and from the ocean.

During the fifth hour after transit, the Hudson river is still pouring into Raritan bay a falling stream, and a local current to the eastward through Hell Gate commences.

During the sixth hour after transit, the upper harbor in the path of the Hudson becomes slack, while a stream sets into it from the lower harbor, and another stream sets out of it into Long Island sound.

During the seventh hour, the current becomes continuous from the ocean through New York harbor into the sound. The tide is rising throughout our entire field.

During the eighth hour, high water occurs at Sandy Hook and the half-tide stage is reached in Hell Gate. The current is a continuous flow toward the sound as far as Sand's point, where a depression exists, toward which the currents from either direction are flowing.

During the ninth hour, the movement over the outer bar ceases; the upper harbor reaches its maximum elevation and commences to fall, but still a steady stream sets into the sound upon one hand and up the Hudson upon the other.

During the tenth hour, high tide occurs from point to point along the East river, and at Dobbs Ferry in the Hudson. A pretty general slackening up of the upper harbor drifts takes place, although the Hudson inflow still obtains.

During the eleventh hour after transit, the Hudson inflow ceases; but a stream flows from the East river (as far as the Gate), and, uniting with an ebb stream of the harbor and that of Raritan bay, makes the flow continuous to the ocean.

During the twelfth hour, the current from the sound, uniting with that of the harbor, flows into the sea as a continuous stream.

#### WATER COMMUNICATION.

New York has water communication with all points in the maritime world, and vessels from all nations congregate at her wharves. Regular lines of steamships ply between this port and nearly all European ports, the principal ones running to Queenstown, Liverpool, London, Glasgow, Belfast, Barrow-in-Furness, and Southampton, in Great Britain; Havre, Bordeaux, and Marseilles, in France; Bremen, Hamburg, Antwerp, Copenhagen, etc.; also to Bermuda, Rio Janeiro, Havana, Mexico, west coast of South America, West Indies, etc. Coastwise steamers ply regularly to all the principal Atlantic ports from Saint John's, Newfoundland, to Brownsville, Texas, and the Pacific mail-steamers run to Aspinwall. Steamboats run regularly between New York and Albany and Troy, and all intermediate towns on the Hudson, while a large fleet of steamers to New Haven, Bridgeport, Norwich, Newport, Fall River, and Providence accommodate the ever-increasing trade between the city and New England. During the summer season many steamboats are in constant requisition to carry pleasure-parties from the metropolis to the many resorts in the vicinity. Inland water communication is maintained by way of the Hudson river and the Erie canal with the lakes, and by way of the Hudson river and the Champlain canal with the Saint Lawrence; and via the Raritan river, Delaware and Raritan canal, Delaware river, and the Delaware canal, with Philadelphia and Baltimore.

#### RAILROAD COMMUNICATION.

Though New York is really the terminal point of a number of railroad lines, the majority of them have their depots either in Jersey City, Hoboken, or Brooklyn, using ferry-boats to transfer their freight and passengers to the city. These lines are enumerated in the reports of the respective cities, and the railroads now mentioned are the only ones that enter the city direct:

The New York Central and Hudson River railroad, main line to Buffalo, New York, 441.75 miles; branches, 298.42 miles; and leases 278.10 miles, making a total of 1,018.27 miles. By connections at Buffalo, this road has uninterrupted communication with Chicago and the Northwest, and with San Francisco on the west, and, via Albany, with Montreal on the north.

The Harlem River and Port Chester railroad, to New Rochelle, 11.80 miles, is now operated by the New York, New Haven, and Hartford railroad.

The New York City and Northern railroad, from High Bridge to Brewster, New York, 51.33 miles. The passengers on this road come into the compact part of the city on the elevated-railroad lines.

The New York and Harlem railroad, to Chatham, New York, 126.96 miles, is now leased by the New York Central and Hudson River railroad.

The New York, New Haven, and Hartford railroad, to Boston, Massachusetts, through the cities named. A branch of this road, known as the Shore line, diverges at New Haven and goes to Boston by way of New London and Providence.

The New York and New England railroad, to Boston, via New Haven (at least its express trains come on the New Haven), Hartford, and Willimantic, comes into the city over the track of the New York City and Northern railroad.

The Spuyten Duyvil and Port Morris railroad, leased by the New York Central and Hudson River railroad, runs to Spuyten Duyvil and connects the road now operating it with the New York and Harlem railroad.

All of the above lines, with the exception of the New York City and Northern, use the Grand Central depot.



## TRIBUTARY COUNTRY.

New York has no tributary country, in the sense used under this heading in the reports of other cities, but it can truthfully be said that the whole United States is more or less tributary to the city. The local trade with the market-gardens on Long Island and New Jersey is very large, and a great portion of the dairy products within 50 miles of the city seek a market here.

## TOPOGRAPHY.

The total area of the city, not including the islands in the East river, is 25,780 acres, or 40.3 square miles. The principal portion of the city is on Manhattan island, area 13,463 acres, while that portion on the mainland (the annexed district) known as the 23d and 24th wards has an area of 12,317 acres. The extreme length of the city is 21.1 miles, the island being 13.5 miles in length, and the 23d and 24th wards 7.6 miles. The total water-front is 44 miles, which is 1.1 mile to each square mile of territory—a feature which gives great commercial advantages to the city. In addition to the above, the following are owned and occupied by the municipal authorities: Blackwell's island, area 120 acres, a long, low, narrow strip of land lying between Manhattan and Long islands, and containing the penitentiary, workhouse, hospital, etc.; Ward's island, area 200 acres, forming the northern boundary of Hell Gate, is nearly round, is fairly well timbered, and has several public hospitals, etc.; Randall's island, area 100 acres, the channel to the north of it being known as Little Hell Gate, and divided from the Westchester shore by the Harlem kills, has the house of refuge, idiot asylum, and hospital; while Hart's island, some little distance up, area 100 acres, contains one of the most important of the city burying-grounds. These add a total of 520 acres to the area of the city. Governor's, Bedlow's, and Ellis islands, in the upper bay, are owned and occupied by the United States government, and are fortified.

The accompanying map shows the original topography of Manhattan island from the Battery to One hundred and fifty-fifth street, as accurately as it has been possible to reconstruct it from the best available records. It is overlaid with a faint indication of the present streets and avenues. The original water-courses of importance, the swamps and ponds to which these furnished outlets, the original shore-line, and the various elevations and depressions are shown, it is believed, with reasonable accuracy. As the map indicates, there was not very much elevated level land in the lower part of the island. A deep creek set inland along the course of Broad street nearly to Wall street, another ran up Maiden lane to Nassau street, and a depression penetrated for some distance at Peck slip. Just below that point a low marsh nearly connected the East river with the Collect (Fresh Water) pond (where the tombs now stands). This pond poured into the Hudson river through a depression at Canal street, its channel being joined by that of another stream running from Reade street west of West Broadway. There was thus a continuous swamp separating the lower part of the island from the higher ground north of Canal street and of Pearl street. This higher ground, with the exception of an extensive swamp on the east side, between Grand and Twelfth streets, was apparently well elevated above the tide-level, and parts of it were of tolerably uniform grade. It was penetrated by the valley of Minetta brook, which led to the Hudson river above Canal street, and which extended as far as Twentieth street and Fifth avenue. Another brook of considerable size discharged into the East river at Seventeenth street, and took its rise in the district between Fifth and Sixth avenues, and between Twenty-first and Twenty-seventh streets. The other streams shown are still familiar to those who have known New York for a quarter of a century past, but those above described became obliterated so long ago that few remember their exact locality and character. At Seventeenth street, the made land has been extended from First avenue, which was the original shore-line, to beyond avenue D. On the west side, Twenty-third street has been extended from the original shore at Tenth avenue to about 400 feet beyond Eleventh avenue. The whole shore from the Battery up to Thirty-fifth street on the east side, and up to Fortieth street on the west side, has been considerably projected beyond the original shore-line. Above Twenty-seventh street we strike a much more rugged and varied formation, rock predominating over a very large part of the area, with considerable elevations above sea-level, and this condition prevails over the remainder of the city, including the 23d and 24th wards.

The rock foundation of the city consists of rudely upheaved masses of gneiss and schist, with some smaller masses of serpentine dolomites. The river-beds on either side are geologically described by Prof. John T. Hewsberry as gorges worn in the rock 200 to 300 feet below the present water-surface. "The greatest depth of water in New York harbor and Hudson river is about 60 feet; but this does not represent the true depth of the channels, since they have been very much silted up, and their rock bottoms are probably 200 or 300 feet below the water-surface."

The present elevations above mean sea-level are, at City Hall park, corner of Broadway and Chambers street, 33 feet; average along Canal street from the Hudson river to Center street, and along Baxter and Roosevelt streets to James slip, 8 feet; First avenue and Forty-second street, 72 feet; Thirty-ninth street between Madison and Fifth avenues, 79 feet; Fifty-first street and Fifth avenue, 72 feet; Fifth avenue and Seventieth to Seventy-first street, 80 feet; Fourth avenue and Ninety-third street, 115 feet; Ninth avenue and Sixty-first street, 91 feet; between Seventy-sixth and Seventy-ninth streets and Ninth and Tenth avenues, 95 feet; and above this point the elevations vary up to 271 feet at One hundred and eighty-fourth street and Thirteenth avenue, on the island, and 282 feet at Riverdale, in the annexed district. The line of the Bowery from Chatham square to Union square, and thence along

Broadway to Madison square, occupies the ridge of the island—the ground sloping on either hand toward the river—with an average elevation above tide-water of from 40 to 45 feet in its whole length. The land included in a line drawn from One hundred and fifty-fifth street and Eighth avenue, to One hundred and tenth street, to Fifth avenue, to avenue A and Ninety-second street at the East river, and thence up the river to the place of beginning, is known as the Harlem plains, with an average elevation of from 10 to 25 feet above high tide, Mount Morris square, with an elevation of 101 feet, being the only exception. The small hills to the southeast of the plains have an average elevation of about 50 feet; while those along Seventh avenue, from One hundred and thirty-fifth street to One hundred and fifty-fifth street, range from 30 to 50 feet.

#### THE POINTS OF THE COMPASS.

All material things are relative, and in New York even the inflexible meridian of the geographer has had to yield place in the popular imagination to the direction of Broadway and the principal avenues. To the New Yorker, south is toward the Battery, and the September sun rises over the foot of east Fourteenth street; the south side of the street is considered the shady side, and in estimating the salubrity of front and rear rooms little regard seems to be paid to the actual location.

The fact is that the direction of the avenues of the city is  $30^{\circ}$  east of north, or  $60^{\circ}$  north of east. On the 21st of June the direction of the rising sun is only  $23^{\circ}$  to the eastward of the direction of the avenues, its rays, from March to September, striking the "north" sides of the houses for a long time after sunrise. Only in December do the rays of the rising sun strike the south sides of the houses.

The relation between sunrise and sunset, and the angle of the crossstreets to the meridian, are shown in the accompanying cut.

It is an unimportant but curious fallacy to suppose that New York is squeezed into a narrow strip of land lying between rivers running so near together as almost to throttle its circulation. Nothing is more common, when comparisons are made between different American cities, than the importance given to the restraining influence of the great narrowness of the city, and few even in New York realize how far this opinion is from being well founded.

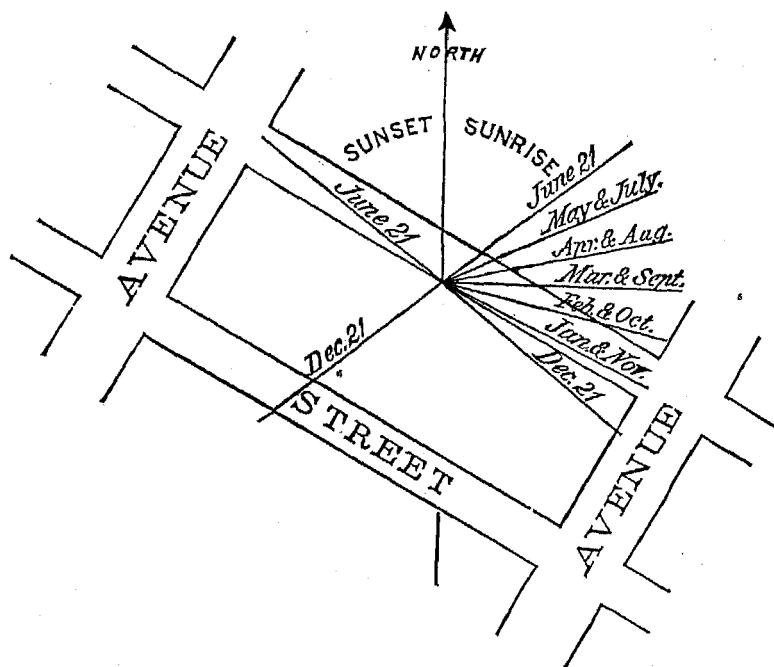
The visitor and sight-seer knows New York chiefly between Third avenue and Sixth avenue, and between the Bowery and Broadway. His occasions for going outside of this district are few, and he seems to be little impressed with the importance of the lateral districts as compared with the great central avenues of communication

between the upper and the lower parts of the city. Fashion is more restricted than even the sight-seer, and, with few exceptions, all the way to Central park, those who live east of Third avenue or west of Sixth avenue would move within the charmed limits if they could. There is every reason why the visitor or sight-seer should confine his observations chiefly to those parts of the city which are the most interesting; and there is certainly every reason why those who are able to select their locations should establish their houses according to their preferences—among those who are the best housed, and whose society offers them the strongest inducements for neighborhood.

There is no reason, however, why New York should be made to suffer in the public estimation of its width by the fact of its great length. The proportion between length and width is due to the fact that its extension must be longitudinal. That it is relatively narrow is true; that it is actually narrow is by no means true.

The following table gives the width of New York city from river to river between Canal street and Ninety-second street:

	Miles.
Canal street .....	2.04
Houston street .....	2.03
Fourteenth street .....	2.34
Twenty-third street .....	1.97
Forty-second street .....	1.96
Fifty-third street .....	2.00
Eighty-sixth street .....	2.25
Ninety-second street .....	2.03



The average of these widths is 2.08 miles, being almost identical with the width of Philadelphia from the Delaware to the Schuylkill on Chestnut street (2.12) miles, and being over one-third more than the length of Boston from the foot of Hanover street to the corner of Arlington and Boylston streets, beyond the public garden (1.5 mile).

Some of the unconsidered parts of New York—east of the Bowery for example—are among the most densely populated city areas of Christendom, while between Fourteenth street and Thirty-fourth street, west of Sixth avenue, there are 17½ miles of streets running to the river, mostly occupied with the comfortable and even elegant residences of prosperous families.

## CLIMATE.

New York is surrounded by broad deep rivers and the upper bay; it is distant only a few miles from the ocean, and the hills in the vicinity are but a few hundred feet in height. Although the climate is generally mild, it is changeable, there being much hot weather in summer, while the cold in winter is sometimes severe. The greatest daily variation of temperature occurs in the first half of the year, and mainly during the spring months. The prevailing wind is from the west—the record for ten years showing that during an average of 275 days in each year the wind has been from the west or west-northwest.

The following tables, etc., are from the reports of the meteorological observatory in Central park. This observatory was organized in 1869, and is provided with self-recording instruments, which register continuously the movements of the thermometer and the barometer, the direction, force, and velocity of the wind, and the rainfall. The observatory is located on the line of Sixty-fourth street, just west of Fifth avenue, nearly in the center of the island, and is well adapted for the uses for which it is erected. The observation-rooms are situated about 50 feet above the surface of the ground, and the temperatures noted at this point are several degrees lower than those taken in the business portions of the city.

The following is a summary of the weather for the year 1879:

Barometer, mean for the year .....	inches..	29.947
Thermometer, mean for the year, dry.....		52.35°
Thermometer, mean for the year, wet.....		47.99°
Sunshine, actual number of hours .....		3,101
Sunshine, greatest possible number of hours.....		4,449
Number of days in which no clouds passed over the sun.....		81
Rain fell on 105 days; snow fell on 21 days; total.....	days..	126

The following table shows the highest and lowest temperatures, rainfall, etc., during the past ten years:

Year.	Maximum temperature.	Minimum temperature.	RAINFALL.			
			Number of days in which rain or snow fell.	Duration for the year.	Amount of water.	Depth of snow.
	Degrees.	Degrees.		D. H. M.	Inches.	Inches.
1870.....	94	9	116	33 17 5	39.25	25.49
1871.....	92	-2	138	41 0 22	51.26	34.22
1872.....	95	3	125	31 2 30	42.49	40.37
1873.....	94	-1	143	38 17 15	47.99	40.93
1874.....	98	3	117	30 16 35	45.83	35.62
1875.....	93	-3	131	37 22 30	40.90	48.25
1876.....	98	3	122	30 5 5	41.77	30.74
1877.....	92	10	116	30 11 55	40.18	27.37
1878.....	94	7	115	36 1 24	48.66	13.74
1879.....	98	-4	126	34 15 35	39.03	37.62
Average.....	94.8	2.5	124.9	35 2 20	43.74	33.435

## STREETS.

On Manhattan island, or in the city proper, there are 333½ miles of paved streets, and 50 miles of streets laid out with cobble-stones and sidewalks, but not paved. Of the paved streets, 229½ miles are laid with stone blocks, 79 miles with cobble-stones, 24½ with Telford macadam, and ½ mile with concrete. The use of the last-mentioned material has been regarded thus far in the light of an experiment. Wooden pavements have all been removed, and all gravel streets have been merged in the macadam. The cost per square yard of each, as nearly as it may be estimated, has been: For cobble-stones, 55 cents; for Belgian trap-blocks, \$1 56, \$1 67, and \$2 40, and for Belgian granite blocks, \$1 92, \$2 11, \$2 56, and \$2 89; asphalt, \$3 50, but could be put down now for \$2 50; and Telford macadam, \$1 70. The wooden pavement, when laid, cost from \$5 to \$6 per square yard. All the lower part of the city, and in fact up to the macadamized boulevards and broad driving avenues leading northward from Central park, is being paved as fully as possible with stone blocks. These are considered the best, unless the asphalt.

experiment succeeds, when that class of pavement will be applied to some streets. The cost of keeping the block pavements in repair is estimated to be about \$517 a mile per annum, and, leaving out the asphalt, the stone blocks are the most easily kept clean.

All sidewalks put down by the department of public works are uniformly of one sort, *i. e.*, bluestone flagging, laid in 4-foot widths at first, and afterward widened so as to cover the entire area of the sidewalk if it is deemed necessary. Many of the property-owners, especially in the lower part of the city, have had large sheets of granite or of bluestone laid down, many of them being of sufficient size to cover the sidewalk from house to curb in one piece. As such large sheets of granite are very expensive, they have been used only in the most exposed positions, and that mainly because of their great durability, as well as on account of their good appearance. Bluestone has been laid in immense platforms in front of dwellings in the better portions of the city. Patented or cement sidewalks are also used in many portions of the city, their color and pattern varying with the whim of the house-owners; sometimes in large sheets, again in small pieces—often diamond-shaped, with the alternate blocks in different colors, such as red and blue, or black and gray, etc. Sandstone sidewalks are used to some extent, but the brick sidewalks now remaining are being rapidly replaced by other material.

The curbs are of North River stone, not less than 3 feet in length, 5 inches thick, 20 inches deep, and must be matched throughout. The top of the curb must be at least 10 inches above the upper surface of the gutter, and must be back-filled and backed up with at least 1 foot of clean gritty earth or clean coal-ashes. When streets are newly opened, gutter-stones 30 inches in length, 4½ inches thick, and 14 inches in width are laid. In the streets paved with granite blocks there are no gutter-stones proper, while on the macadam streets the gutters are of trap-blocks put in for this purpose, extending several feet out from the curb.

During the past year (1880) there were 244,807 square yards of new pavement laid, covering 12 miles of streets. Of these pavements 198,277 square yards were paid for out of the annual appropriation, while the remainder were paid for by assessment on the adjacent property.

The length of streets, roads, avenues, etc., in public use in the "annexed district" (23d and 24th wards) is estimated at 182 miles, of which 2.70 miles are paved with stone blocks and 24.72 miles with macadam. It is impossible to give a correct statement of the sidewalks in the district, as the changes from a graded and flagged sidewalk, with curb, to a mere foot-path by the side of a country road are numerous.

There is no systematic tree-planting along the streets in New York, but there are, however, many trees, irregularly kept, generally standing inside the curb-line, while the Boulevard from Fifty-ninth street to One hundred and twenty-fifth street has a central grassed space set with trees. The construction of streets is now done by contract, under direction of the department of public works. A steam stone-crusher and a steam-roller are constantly used in the repair of the macadamized streets, and with good effect.

*Horse-railroads.*—There are 17 horse-railroads in the city, with a total length of 135.58 miles. The companies operating these roads have an aggregate of 1,493 cars and 11,760 horses and mules, and carry annually 160,952,832 passengers. The rates of fare are 5 or 6 cents. The different lines are as follows:

Bleecker Street and Fulton Ferry, across the city from the foot of West Twenty-third street to Fulton ferry.

Broadway and Seventh Avenue, from corner of Fifty-ninth street and Seventh avenue to Broadway and Barclay street.

Central Cross-town line, from foot of East Twenty-third street across the city to corner Christopher and West streets.

Central Park and North and East Rivers. This line runs from South ferry to Central park, the western division going up the North River side to Tenth avenue and West Fifty-ninth street, and the eastern division going up to the same point on the east side of the island.

Christopher and Tenth Streets, from foot of Christopher street across the city to foot of East Tenth street.

Dry Dock, East Broadway, and Battery, from foot of East Twenty-third street to corner of Broadway and Ann street; with Canal street back to foot of Cortlandt street, and Desbrosses Street Ferry branch from foot of Grand street to Desbrosses Street ferry.

Eighth Avenue line, from corner of Broadway and Vesey street to Harlem river.

Forty-second Street and Grand Street Ferry, from foot of West Forty-second street (Weehawken ferry) to Grand Street ferry.

Fourth Avenue line, from corner of Broadway and Ann street to East Eighty-sixth street, via Grand street, Bowery, Fourth avenue, and Madison avenue, with a branch through East Thirty-second street to Hunter's Point ferry.

Harlem Bridge, Morrisiana, and Fordham, from East One hundred and thirtieth street up Third avenue to Fordham.

Ninth Avenue line, from Broadway and Fulton street to corner of Ninth avenue and Fifty-fifth street.

One Hundred and Twenty-fifth Street line, from corner of Third avenue and One hundred and thirtieth street to and through One hundred and twenty-fifth street to foot of One hundred and thirtieth street, North river. This line is leased by the Third Avenue company.

Second Avenue line, from Peck slip, via South, Chatham, and Grand streets and the Bowery and Second avenue to Harlem river.

Sixth Avenue line, from corner of Broadway and Vesey street to Central park, corner of Sixth avenue and West Fifty-ninth street.

South Ferry and Vesey Street, from South ferry to Vesey street, one block from and parallel to Broadway.

Third Avenue line, from Broadway and Ann street to Harlem river, via Chatham street, Bowery, and Third avenue.

Twenty-third Street and Erie Ferry runs directly across the island on Twenty-third street from the North to the East river.

Each car of every city railroad is taxed at the rate of \$25 per annum, and each car-driver is required to pay 25 cents a year for a license. During the past year there were 766 licensed car-drivers in New York. All the horse-railroad lines are required to keep the streets between the rails and on either side of them paved with Belgian blocks or small cobble-stones, but it does not appear that this requirement is always complied with. The commissioner of public works, in his report for the quarter ending December 31, 1878, says:

The street railways interfere seriously with the good condition of the pavements, especially where the streets are narrow, or when there are three or four tracks in the wider streets or avenues. These tracks, either originally or when undergoing repairs, have been raised above the true grade of the street in order to shed the water more effectually, by which the slope of the pavement between the rail and the curb becomes too steep.

*Omnibus lines.*—As early as 1832 omnibuses began running through Broadway to Greenwich street, and their number increased rapidly. For many years Broadway was crowded with this class of vehicles, but as the horse-railroads increased, the omnibus lines were gradually withdrawn, until now there are but three of the latter operating down town and one up town, as follows:

Broadway and Fifth Avenue line, from Fulton ferry up Broadway to Fourteenth street, to Fifth avenue, and along that thoroughfare to Forty-seventh street.

Broadway, Twenty-third Street, and Ninth Avenue line, from South ferry through Broadway to Twenty-third street, then to and up Ninth avenue to Thirtieth street.

Madison Avenue line, from Wall Street ferry through Wall street up and to Broadway to Twenty-third street, and then to and up Madison avenue to the Grand Central depot.

The fare on the above lines is 5 cents, and it is said that the companies pool their earnings.

Manhattan line, from the corner of Thirty-second street and Sixth avenue up Broadway to Fifty-ninth street, and then through the Boulevard to One hundred and twenty-ninth street; also, from the corner of One hundred and twenty-ninth street and the Boulevard to One hundred and fifty-fifth street, and then via Tenth avenue to High Bridge. The fare is 5 cents on each branch, or 10 cents for the through trip, a distance of 8 miles.

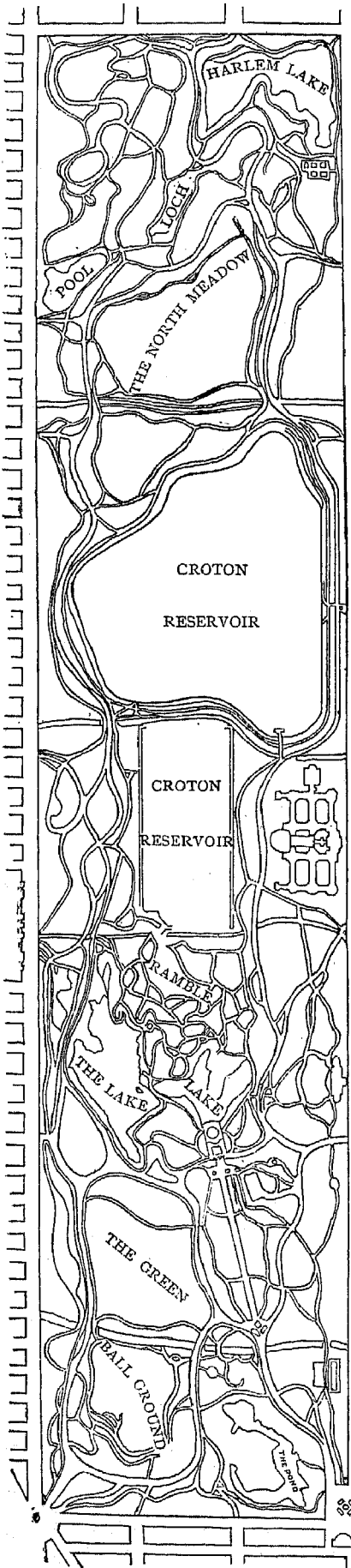
These lines use 215 vehicles and 1,460 horses, and furnish employment to 427 men. The total number of passengers carried averages 41,800 each day, the omnibuses not running on Sundays. Each stage is required to pay a yearly license of \$25, while drivers have to pay 25 cents annually for a permit.

*Rapid transit.*—The elevated railroads of New York start from the Battery and traverse the length of the island to Harlem river, two lines going up the east side on Second and Third avenues, and two on the west side on Sixth and Ninth avenues, with a connecting cross-line on Fifty-third street. The total length of all the roads is 32 miles, the Metropolitan having  $16\frac{7}{8}$ ; the New York,  $13\frac{2}{8}$ ; and the joint structure, used by both,  $2\frac{1}{8}$  miles. The cost of construction of these two railroads, as given in the report of E. Sweet, jr., civil engineer, to the New York legislature, is: New York lines, \$8,719,038 26, and Metropolitan, \$10,829,790 50. These roads have 188 engines and 523 passenger-cars, and carry an average of 190,000 passengers per day. The rate of fare is 10 cents, except during the "commission hours", from 5.30 to 7.30 a. m. and from 5 to 7 p. m., when it is 5 cents.

The Manhattan railway was organized under the "rapid-transit act", and, though it has built no roads of its own, it operates the lines of the Metropolitan and New York under leases for 999 years. The capital stock is \$13,000,000; funded debt assumed under the leases—New York line, 7 per cent. bonds, \$8,500,000; Metropolitan line, 6 per cent. bonds, \$8,500,000; making a total of \$30,000,000. The Manhattan company also guarantees the payment of 10 per cent. on the stock of the two companies, making the annual fixed charges assumed \$2,405,000, before the payment of any dividend on its own stock.

#### WATER-WORKS.

The city is supplied with water by the Croton water-works, which are owned by the city, and cost \$33,712,197, the bonded debt being now \$16,505,000. The supply is drawn from Croton river, the water-works dam being in Westchester county, and is conducted to the city by an aqueduct of solid masonry,  $40\frac{1}{2}$  miles in length, 8 feet  $5\frac{1}{2}$  inches high, 7 feet 5 inches wide at the widest point, and dropping 13 inches to the mile. It has a capacity of a little over 105,000,000 gallons per day. It crosses Harlem river on the High bridge, a structure of granite, 1,450 feet long, 21 feet wide between the parapets, and 114 feet high; is received in two large basins in Central park, and is distributed by two reservoirs through 500 miles of pipe. With the exception of a moderate high pumping service, the distribution is by gravity, the surface of the water in the Central Park reservoirs, when full, being 115.50 feet



above tide. At present the daily consumption of water is about 100,000,000 gallons, nearly the full capacity of the aqueduct, and of this amount 11,605,630 gallons is pumped for the high service. The yearly cost of maintenance is \$340,000, and the amount collected during 1880, for water-rents, penalties, and permits, \$1,560,598 57. The number of meters in use June, 1880, is 2,344. Thus far their use has caused an appreciable diminution in the waste of water. Some of the largest consumers of water have, since the introduction of meters, resorted to the use of wells and sea-water. By the use of meters, so far as they have progressed, and by house-inspections to detect leaks and wastes, the consumption has been kept, under ordinary circumstances, within such limits as not to exceed the daily supply from the aqueduct; but in cold weather the waste by allowing the water to run to prevent freezing in the pipes can not, with the means now available, be suppressed, and the daily consumption is increased several million gallons beyond the capacity of the aqueduct, thus reducing the supply in the reservoirs and the pressure in the pipes.

#### GAS.

New York is supplied with gas by five private corporations, that have an aggregate of 860 miles of pipes laid under the streets, exclusive of house-connections. The charge to private consumers is \$2 25 per 1,000 feet. For the quarter ending March 31, 1880, the city paid \$81,313 45 for gas consumed in 23,231 street-lamps, and the maintenance, lighting, etc., of the same.

#### PUBLIC BUILDINGS.

The city of New York covers the entire county of New York, and therefore all public buildings are classed together. From the report of real estate exempted by law, it is seen that the assessed value of public buildings in the city, used wholly or partly for municipal and county purposes, is \$46,821,180. This includes the city hall, county court-house, police courts, markets, school-houses, hospitals, penal institutions, reformatories, police stations, engine-houses, etc. The most noted buildings are the city hall and the county court-house, both standing in City Hall park. They are of marble, except the rear of the former, which is of brownstone.

The buildings belonging to the United States government are the post-office, the custom-house, and the sub-treasury. There are also many large buildings in various portions of the city that are quite as large as many of the municipal buildings, though not used for public purposes.

#### PUBLIC PARKS AND PLEASURE-GROUNDS.

The total area of all parks in the city is 1,007.25 acres. The largest and most important is Central park, area 862 acres. It extends from Fifty-ninth street on the south to One hundred and tenth street on the north, and from Fifth avenue on the east to Eighth avenue on the west, making a perfect parallelogram of about  $2\frac{1}{2}$  miles by  $\frac{1}{2}$  mile. It is divided into two unequal parts by the two reservoirs, which occupy 150 acres of its area. The park is laid out and ornamented in accordance with plans designed by Messrs. F. Law Olmstead and Calvert Vaux, who controlled its original construction. The two divisions of the park, known as the "upper" and the "lower", are not only separated artificially, but they differ very materially in character. The upper park is distinguished by the freer sweep and greater variety of its horizon lines, as well as by the fine views it commands of the surrounding country. The park lies over the crests and along the slopes of several irregular ridges. The greatest elevations are found in the central, westerly, and northwesterly portions. There were two swampy places in the lower park, lying between ridges of rock, and these have been transformed into ornamental ponds, one with an area of 20 acres. The ridge and plateau separating these depressions have been treated with great skill. One large wet tract has been filled in to an



average depth of 2 feet, all of the rocks above the surface of the ground have been removed, some large adjoining ledges have been reduced, and its hollows filled, 30 acres of nearly level open ground having thus been secured. East of this extends "the Green", another level space, 80 rods in length and 12 rods in width, through which runs a broad walk, planted on either side with two rows of American elms, and called "the Mall". The accompanying skeleton plan of the park will give a general idea of the walks, drives, etc. The assessed valuation of Central park is \$29,750,000.

In addition to Central park there are: the Battery, at the extreme southerly end of the island, facing the bay; Bowling Green, a few squares above, at the foot of Broadway; a park on Deane street, one on West street, and one on the corner of West Broadway and Beach street; City Hall park, on Broadway, between Chambers and Park place; Abingdon square, corner Hudson street and Eighth avenue; Union square, Broadway to Fourth avenue, and from Fourteenth to Seventeenth streets; Madison square, from Fifth to Madison avenue, and from Twenty-third to Twenty-fifth street; Washington square, at the southern extremity of Fifth avenue; Stuyvesant square, at East Fifteenth and Seventeenth streets; Gramercy park (private), on Fourth and Third avenues, Twentieth to Twenty-first street; Tompkins square, from avenue A to avenue B, and Seventh to Tenth streets; Riverside park, between Eleventh and Twelfth avenues, and from Eighty-eighth to One hundred and twenty-ninth street; Morningside park, on Ninth avenue, between One hundred and tenth and One hundred and twelfth streets; High Bridge park, area 20 acres, on Tenth avenue, near High bridge; a park on Fifth avenue, between Fifty-eighth and Fifty-ninth streets, and another on Fulton avenue, between One hundred and sixty-ninth and One hundred and seventieth streets.

The accompanying map of the city indicates the location of these parks. All the parks are controlled and managed by the board of park commissioners, and regular appropriations are made for their care and maintenance, as well as for the employment of park policemen and watchmen.

#### PLACES OF AMUSEMENT.

In the following places of amusement in the city, holding theater licenses, theatrical entertainments are regularly given:

Academy of Music, corner Fourteenth street and Lexington avenue, was built in 1852, has a seating capacity of 2,342, and cost originally, with the land, \$300,000.

Aberle's theater, No. 147 East Eighth street, was built in 1879, seats 1,700, and has cost for alterations about \$27,000.

American theater, No. 443 Third avenue, built in 1873, has cost \$10,000 for alterations, and has a seating capacity of 950 persons.

Bijou opera-house, No. 1239 Broadway, between Thirtieth and Thirty-first streets, has a seating capacity of 700, and cost \$150,000.

Booth's theater, corner of Sixth avenue and Twenty-third street, was built in 1869 at a cost of \$1,000,000, with the land, and seats 1,800 persons.

Broadway theater, at 728 Broadway, opposite Waverly place, was formerly the Church of the Messiah, and has been altered into a theater, with a seating capacity of 1,200.

Daly's theater, Thirtieth street, corner of Broadway, was built in 1866, has a seating capacity of 1,200, and is valued at present at \$150,000.

Fifth Avenue theater, No. 29 West Twenty-eighth street, was built in 1873, seats 1,660 persons, and cost originally, including land, \$300,000.

Germania theater, on Fourteenth street, near Third avenue, was built in 1871, and has a seating capacity of 600. The alterations have cost \$17,000.

Grand opera-house, on Eighth avenue, corner of Twenty-third street, was built in 1869 at a cost of \$800,000, and has a seating capacity of 1,966.

Haverly's theater, on Fourteenth street, between Sixth and Seventh avenues, has a seating capacity of 1,900, and was built in 1868, at a cost of \$412,000, not including land.

London theater, on the Bowery, near Center street, has a seating capacity of 1,900. It was built in 1875 at a cost of \$37,000.

Madison Square theater, on Twenty-fourth street, near Fifth avenue, has a seating capacity of 675, and was built in 1879 at a cost of \$135,000.

Miner's theater, on the Bowery, near Broome street, was built in 1878 at a cost of \$48,000, and has a seating capacity of 3,200.

National theater, on the Bowery, near Grand street, was built in 1880 at a cost of \$25,000, and has a seating capacity of 900.

Niblo's Garden, at No. 580 Broadway, under the Metropolitan hotel.

Novelty theater, No. 113 Bowery, has a seating capacity of 1,000, and was built in 1872. Its present value, not including land, is \$20,000.

Park theater, No. 932 Broadway, between Twenty-first and Twenty-second streets, has a seating capacity of 954, and was built in 1874 at a cost of \$112,000.

Tony Pastor's theater, at 587 Broadway, was built in 1858, and has a seating capacity of 2,300.

San Francisco Minstrels, on Broadway, between Twenty-eighth and Twenty-ninth streets, has a seating capacity of 800, and was built in 1874 at a cost, including the land, of \$100,000.

Standard theater, on Broadway, between Thirty-second and Thirty-third streets, was built in 1875 at a cost of \$125,000, and has a seating capacity of 1,260.

Thalia theater, on the Bowery, near Canal street, has a seating capacity of 1,923, and was built in 1842 at a cost of \$250,000.

Theater Comique, No. 514 Broadway, near Broome street, has a seating capacity of 1,000.

Union Square theater, on Fourteenth street, facing Union square, was built in 1870 at a cost of \$125,000, and seats 1,300 persons.

Volks-Garden, on the Bowery, above Spring street, has a seating capacity of 800.

Wallack's theater, Broadway, corner of Thirteenth street, was built in 1861 at a cost of \$75,000, and has a seating capacity of 2,200.

Windsor theater, No. 45 Bowery, near Canal street, has a seating capacity of 3,500, and was built in 1862 at a cost of \$185,000.

In addition to the above there are also two places of amusement that hold theater licenses, but can hardly be classed as theaters, viz: Harry Hill's, on Houston street, near Broadway, with a seating capacity of 1,200, and the New York Aquarium, on Broadway, corner of Thirty-fifth street, with a seating capacity of 800.

All theaters pay to the city an annual license of \$500 without regard to size. The fire department compels the proprietors of all theaters, as well as every other place of amusement in the city, to provide all necessary appliances for the extinguishing of any slight fire. It is also required that at each place one or more firemen shall be stationed during every performance. The building department also sees that the law governing exits, etc., has been carried out.

Besides the theaters enumerated here, there are 51 halls, ranging in seating capacity from 500 to 2,000, and 15 concert- and beer-gardens. There are also 26 public libraries that should hardly be classed under this head. The limited space allowed for the report on New York prevents a detailed description of the halls, gardens, and libraries, but a reference to the accompanying plan will give the reader an idea of how the places of amusement are scattered over the city.

#### DRAINAGE.

*Sanitary condition.*—The area that generally presents itself to the mind in connection with the city of New York is the area of Manhattan island alone. It is often not known or not remembered that a large part of the adjacent county of Westchester has recently been brought within the corporate limits. This added country, with the exception of the villages of Morrisania, Fordham, and West Farms, is an almost purely country district, with hill and dale, upland and meadow, forest and open. Neither with reference to its drainage nor with reference to other features is it worth while in this description to consider this portion of the city, where sometimes scarcely a hundred inhabitants can be counted to the square mile, while in some of the crowded wards of the older part of the city more than 222,000 human beings reside within the same area of one square mile, besides thousands of others who come to them to attend to their daily avocations.

In New York, more than in most other cities, the investigation of sanitary conditions is complicated with such unusual elements that it becomes difficult to make any investigation or report which will set forth the true conditions, or enable a comparison with other cities to be made. Here, more than anywhere else, the population lives apart from its work, usually in other parts of the city, and often beyond its limits. It is only possible to select certain localities within ordinary boundaries, and within these limits to consider what is known, or at least believed, to influence the health of its people—things which are beyond the control of the individual citizen, as, for instance, the supply of water, sewerage, house-drainage, condition of streets and pavements, the character of houses offered for sale or rent at prices within reach of the means of its people, and many other conditions which contribute to the health and comfort of the inhabitants of the great metropolis.

Since nearly all unhealthful influences, except those connected with unwholesome food and drink, may be said to affect the system through the medium of the atmosphere, it becomes of the first importance to consider those causes which tend to pollute or otherwise influence the air of the city. Atmospheric pollution is of less consequence in sparse settlements and where there is a free circulation of air. But in a great city like New York, with other great cities on either hand, with all manner of manufacturing-establishments in operation, and with practically no vegetation to exert a counteracting influence, atmospheric pollution becomes a great danger to health and life.

One of the most active sources of atmospheric pollution, especially as affecting the atmosphere within houses, is the pollution of the soil, and the influence of this pollution on the aqueous vapor escaping from it. The natural provision by which the soil is purified—the action of vegetation and interior aeration—is practically withheld from

New York, where trees and grass hardly exist, and where the ground is so largely covered with buildings and with pavements. The growth of population has in many parts of the city so encroached upon even the back yards and grapevine arbors of thirty years ago that the city is fast losing even these minor aids to purification.

In the regulation of many streets, natural water-courses have been cut off, obstructed, and filled up, and provision has rarely been made for carrying away the ground-water, which formerly found open channels to the rivers. It is useless to consider how a proper system of subsoil drainage might have been constructed and maintained; those having charge of the public works of the city, under present circumstances, can do nothing more than to provide in the streets such drainage as they may find practicable for the lots adjoining them. Lots have been filled with earth, stones, rubbish, ashes, and street-sweepings, containing garbage and other organic matter. Too often this filling has been made over lands saturated or overflowed by streams obstructed in the construction of streets. Little by little, with a reasonable artificial drainage, this filling settles, its organic matter is removed or carbonized by decomposition, and the land finally shakes itself down into a condition tolerable for the construction of dwellings—becoming tolerable sometimes before and sometimes after building. In some cases the plane of saturation has been raised much above its normal level, and cellars and basements have been made unfit not only for human habitations, but unfit for living over. The filling has in a great measure concealed the ill effects of bad drainage, but has afforded no remedy for it. When a block is so filled in, the cellars of the buildings erected serve as basins for collecting the soakage-water of the adjacent ground. A connection with the sewer leads off the excess of water; but these first cellars thus become not only receptacles, but channels through which drainage from adjacent lots finds its way beneath the basement floors to the sewer. This condition is likely to continue until the whole block is built upon and the drainage thus distributed. Houses so located are offered for sale or for rent to persons who know nothing of the original condition of the ground, and who could, in any case, probably find nothing better within reach of their business or their means. These houses are sold and resold. Apartments are rented and boarders are taken in. The aspect of the neighborhood changes, and all recollection of previous condition is lost. The ill-effects continue for years, if not permanently, falling upon the individual who has no remedy, and probably no knowledge of the origin of his discomfort.

The responsibility rests with the municipal authorities, who alone have the opportunity and means of enforcing a proper system of subsoil drainage. This responsibility rests lightly on the public officers, whose time is largely occupied with matters of personal interest, political and otherwise, and the city, which, under the management of a judicious despot, might be made one of the healthiest in the world, is allowed to continue the seat of undue mortality and morbidity.

The topographical map showing the original condition of Manhattan island will suggest, by the indication of swamps, and of the course of brooks and other water-channels, many localities, always insalubrious, which now show on their surface no feature distinguishing them from others where the original condition was good, and from which the defects above described are absent. It would not be safe to assume that all filled lands remote from the shores of the rivers are unwholesome, but where the above-described conditions still exist their influence must inevitably be prejudicial. Neither is it to be assumed that such places, however bad they may have been or may still be, are to remain bad for all time. It should be remembered only that the purifying processes of nature, acting under the restrictions here present, are extremely slow, and the people of New York, as of many other cities, must expect for many years to suffer the penalty of the carelessness and disregard for sanitary improvements which omitted a proper control of the original work.

It is usual to assume that the higher parts of the city, those of which the surface has been cut down rather than filled in, in bringing the streets to their present grade, are necessarily healthy localities for residences. That they are generally better than the filled localities can not be doubted; nor that they are exceptionally good where the original soil consisted, as it did in much of the area below Fourteenth street, of deep, clean sea-sand; that the higher and firmer soils, with a strong admixture of clay marking the original ridges and high lands of the island, can remain even as free as they now are from unfavorable telluric influences is very much to be doubted. An enormous volume of water, soon to be greatly increased, is brought into the city and distributed to all its houses. After receiving the defilement of domestic and manufacturing use, it is discharged into the sewers to follow its more or less obstructed course to the rivers. Unfortunately the sewers themselves—the channels through which this immense flood is constantly being discharged—are far from perfect in construction, and no small proportion of the foul flow finds its way through pervious walls and through imperfect joints into the adjacent ground, saturating it often to the floors of cellars and to the absorbent foundation-walls of buildings. The source of the evil here indicated is one which can only increase in extent with time, and which must increase until the whole drainage system of the city shall be brought into proper accord with the best principles of construction, absolute tightness of all water channels being everywhere desirable, and the absolute tightness of foul-water channels being indispensable.

*Historical notes.*—The sewerage of New York was begun at a very early date—more than two hundred years ago, in 1676. We read that the city then underwent a sanitary revolution; tanneries and slaughter-houses were removed beyond the city limits; streets were improved and paved, low lots were filled in, and the brook flowing

through Broad street was lined with planks and converted into an open sewer. This sewer, which originally drained the swamps and low grounds about Beaver street, has been maintained, and has been from time to time rebuilt. As it stands, it is one of the oldest in the city. It is said to be built of stone and brick, and it is even estimated that there is some wood still remaining in it; but it has settled below tide-level. It has no manholes by which it can be inspected, and no one knows its condition. It is a curiosity of subterranean construction, and is liable at any moment to cave in. Thus far it remains efficient, and it still pours the drainage of 38 acres of densely populated area into the waters of the river.

The accompanying diagram shows the system of sewers discharging through this old outlet.

From this early beginning of sewerage work, the drainage of the city extended in the manner usual in other cities at that time. Low and swampy districts, becoming troublesome, were first provided with drains intended only to collect and carry away the natural drainage reaching them from all sides, or to conceal and remove under cover water rendered unsightly and foul by the discharge of domestic wastes, or by the overflow of vaults and cesspools. Work was continued only as necessity compelled, and drains were made of such shapes and sizes as best suited those who built them, or as suited the opinions of those who happened to be at the time in positions of public authority. They usually followed the nearest practicable course to the river.

When New York began to outgrow its early set limits and to extend up the island, the low ground about Maiden lane demanded attention, and soon thereafter the swamps and meadows about Beekman and Roosevelt streets, the "swamp" of the tanners' and shoe and leather dealers' areas, which required draining and filling to make room for the growing population of the city.

About the beginning of the present century speculation in lots ran high, and public improvements were undertaken at great cost. High hills were cut down and valleys were filled in. A natural water-course traversing the island at Canal street was walled in and converted into a canal, a wide business street being laid out on either side. A stone arch bridge was built at Broadway to carry that street over the canal, and waste places farther up town began to assume a business air.

It had been proposed to lay out and improve an extensive park on the east side of the city, and to include as an important feature therein a deep, clear, and beautiful lake or pond, known as the "Collect", which was supplied by living springs, and which was reported to have no bottom. It was about 40 feet deep. This enterprise was regarded as impracticable, because the proposed park was too far out of town to warrant the expenditure of money upon it. The hills about have been cut down, the low grounds have been filled, the lake has disappeared, and this far-out-of-the-way place is now occupied by the city prison known as the "tombs", and regarded as an old building, while the adjacent lands have become the most densely populated of any portion of this continent or of Europe.

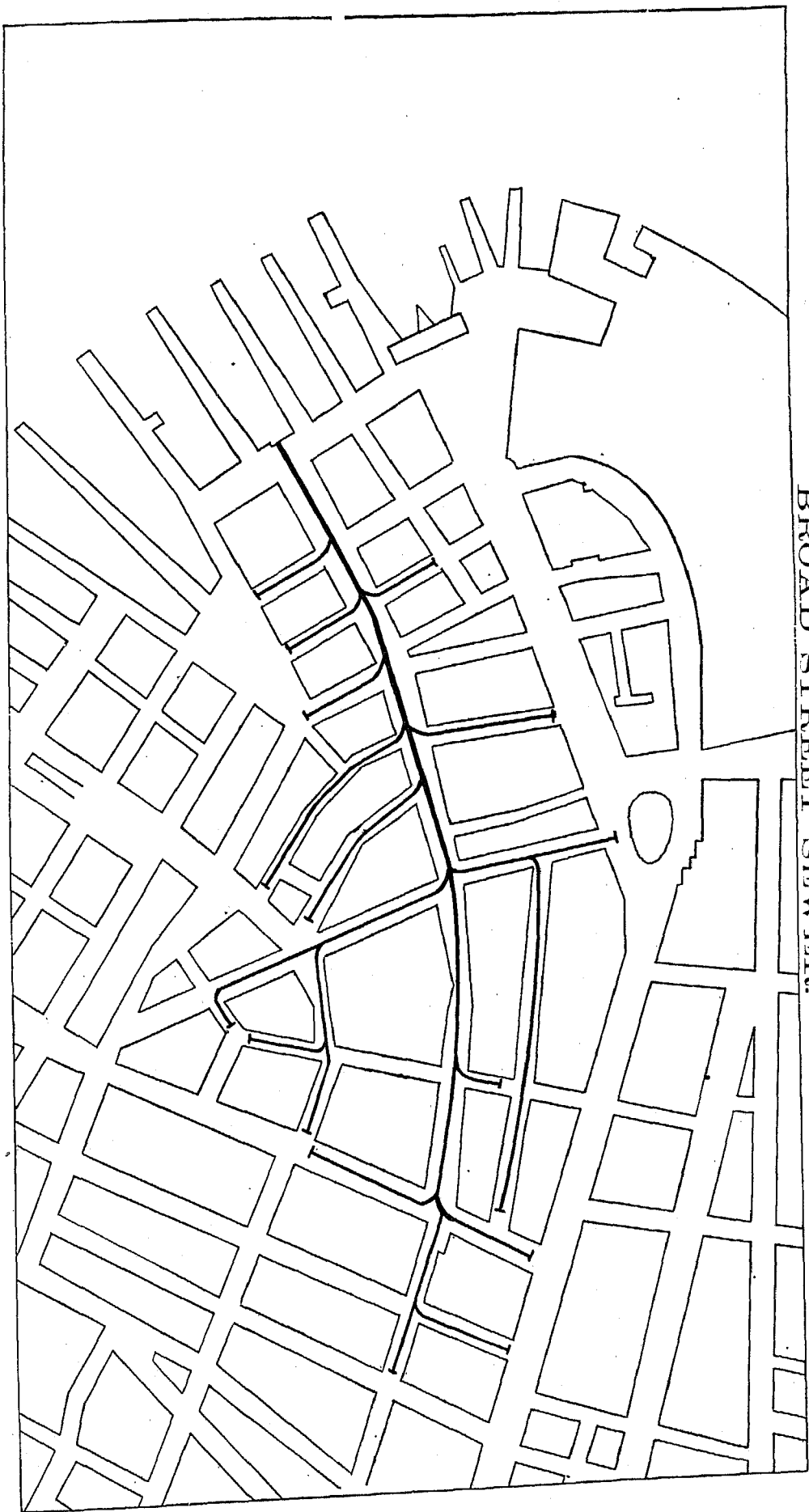
As the city increased, and as the pavement was extended, the area of its roof-surface and paved court-yards concentrated the flow of rain-water, causing trouble and doing damage. Necessity compelled the construction of sewers for the drainage of the streets. Many miles of stone drains had been constructed which answered a fair purpose, but stone was inconvenient to handle, and large flat stones for covering the sewers were not easily available. Thereupon the construction of brick sewers was begun, and better work was done; but nothing like a system was thought of, each street having its direct outlet to the river by the nearest course.

When Croton water was introduced and distributed throughout the city, one would naturally suppose that intelligent citizens would have realized the importance of immediate action in the provision of an intelligent and comprehensive system of sewers. On the contrary, the increased house-drainage was turned into the old drains and sewers, not intended for such use, not adapted to the increased demand upon them, and especially unsuited to carry a constant small flow bearing a large proportion of solid matter in suspension. The sewers at this period were nearly all constructed of brick, and as "self-cleansing" sewers were then unknown, they were made large enough to admit workmen to examine, clean, and repair them. They were 4 feet in diameter, and circular in shape, with the exception of a few large trunk-sewers in Clarkson street, Canal street, and elsewhere. Inlets for admitting water from the streets were rudely built, without provision to prevent the entrance of mud and dirt from the surface, and without means for preventing the escape of the gases of decomposition into the open air.

In the year 1849 the care of the construction and maintenance of sewers was placed under the direction of the very efficient Croton Aqueduct department. The population at that time was about 500,000, and was increasing at the rate of nearly 30,000 per annum. The length of sewers then existing, not already washed in pieces or otherwise destroyed, was estimated at 69.3 miles. To keep pace with the rapid growth of the city, new sewers were constructed at the rate of about 12 miles per annum, so that within the next six years their total length was more than doubled.

Though nominally under the control of the Croton Aqueduct department, sewers were built in such streets, and of such sizes, and with such outlets as were prescribed from time to time by separate acts of the common council. In response to the petition of land-owners, or in compliance with the suggestions of the city surveyor, an ordinance passed by the common council directing the construction of a certain sewer, of a certain size, in a certain street, became a fixed law, and there was no authority by which it could be modified.

BROAD STREET SEWER.



Sewers were sometimes required to discharge in the direction contrary to the grade of the street, and hence must be built with very flat grades and, at points, very near the surface. Abrupt changes of grade were made, and one sewer was joined to another in an arbitrary manner, so that it is not to be wondered at that the greatest confusion existed.

At about this time some city surveyors suggested the reduction of the width of the sewers, and they were built 4 feet high and 3 feet wide. The increased depth of flow, effected by the narrowing of the channel, was found to be so advantageous, that after experiments a uniform size of 4 feet in height by 2 feet 8 inches in width was adopted, and for many years nearly all sewers were built of that size and shape. Nearly the whole system constructed before this time, much of which is still in existence, consisted of 4-foot sewers, carrying but a trifling stream of water trickling along the bottom, totally insufficient to keep them clean. The lack of a proper system was not only bringing the whole network of sewers into confusion, and causing the waste of hundreds of thousands of dollars, but the appointment of incompetent and irresponsible inspectors, through political influence, was filling the city with a class of work buried from sight beneath its streets which was worse than useless. The department having charge of the work could take action only upon one street at a time, as authorized by separate ordinances of the common council. It was hence not only without the authority, but without the means for paying the cost of any work to anticipate the wants of any drainage district. It could make no survey and could undertake no preliminary operations, and it was at this time little more than the agent of the common council in the execution of its several enactments. In public documents of the period, especially in the *Annual Report of the Croton Aqueduct Board* for the year 1863-'64, we find frequent and emphatic appeals for the necessary authority to proceed with a work of such vital importance to the city of New York. These appeals were followed by the passage of the "sewerage act" by the legislature in 1865, authorizing the adoption of a general system. At this time the population had reached three-quarters of a million. The extent of the sewers existing at that time is estimated at 194½ miles, with 2,480 inlet-basins to collect surface-water from the streets, and 10¾ miles of culverts connecting these basins with the sewers. The city officials were thoroughly aware of the condition of the work, and it was reasonable to expect prompt and efficient relief as the result of the greatly increased powers afforded by the legislature.

A corps of engineers was organized, surveys were made, the city was divided into drainage areas or districts, and in order that all new work might be made to conform to a comprehensive system, plans were prepared and filed for that part of the city where the greatest demand for the new sewers was anticipated. But the 200 miles of old work, much of which is beneath the narrowest and most crowded business streets and under railroad tracks, was not to be remodeled or brought to a condition approaching a system without the labor of many years and the expenditure of enormous sums. There was no record of many of the sewers in the downtown districts, and no one could tell what became of the water that entered many of them. Nearly every street leading to the river had its outlet-sewer; the street-basins permitted the entrance of mud and dirt from the gutters, and this soon made its appearance in the docks and slips, rapidly encroaching upon the depth of water by a sediment of soft mud, mingled with organic matter in a state of rapid decomposition, thus not only polluting the waters along the entire river-front, but gradually driving commerce out to the pier-heads or compelling constant dredging to keep the slips clear.

The most obvious immediate necessity seemed to be to prevent the entrance of mud and solid matter from the streets. To this end hundreds of old basins were rebuilt. Another means of relief was to collect the sewage in large intercepting sewers along the river streets, discharging it at a few outlets to be made at the heads of the piers, several hundred feet beyond the bulkhead, with the hope that it would here be swept away by the rapidly flowing tide. The construction of these large collecting-sewers along the narrow and busy streets of the water-front is an undertaking of such magnitude that little has thus far been accomplished.

The first collecting-sewer of this sort was built on the west side, and all of the sewage discharging into the Hudson river from Twenty-third street to Thirty-second street was cut off at Eleventh avenue and first turned into a temporary outlet in 1868. In the report of the sewer department of that year it is said: "It would seem advisable to follow at once the success which has attended the first application of the system adopted, and to prosecute similar works at other points along the river-fronts." This system has since been extended at Seventeenth street, and will be more particularly described and illustrated on a future page. At this time (1868) the growth of the city was so great and speculation in uptown property was so active that the demand for new sewerage-works became greater than ever before. In anticipation of the requirements for building-purposes a large district on the west side of Central park, from Fifty-ninth to Eighty-fourth street, was placed under contract, including 4,547 feet of brick sewers and 8,360 feet of pipe sewers.

Besides this one large contract many smaller ones were made in this and other localities, amounting, in the three years 1867, '68, and '69, to 52½ miles of sewers contracted for. The number of miles actually constructed within these three years was 42.7, and the greatest length of sewers constructed in any one year (1868) was 16.4 miles.

In the annual report of the sewer department for that year (page 24) we are informed that "the demands upon the attention of the department for the development of the unimproved portions of the city have been so earnest and incessant, and its claims have been so decided, equally on grounds of public convenience, economy, and health, that



this board has thought it of superior consequence to first satisfy the necessities of the extraordinary growth of population rather than to divert its energy toward the correction of an evil which, though of much importance, could be postponed with less injury to the citizens at large".

The two important features of the work of the department at this time were—

First, the introduction of the system of exterior collecting-sewers along the water-front, first put in practical operation in the large Eleventh Avenue sewer, between Thirty-second and Twenty-third streets, in 1868.

Second, the introduction of the system of pipe sewers, which has since been extended to all parts of the city. The material used in all cases prior to 1865 was brick masonry, but the superior quality of heavy and strong vitrified pipe brought to this country from Scotland and England, and the successful use of such pipe for public sewers in Europe, soon commended them to the attention of the authorities of New York, and in 1865 contracts for 8 miles of sewers of various patterns included 1 mile of trunk-sewer 6 feet in diameter, in Seventy-fourth street, from Fifth avenue to the East river, while of the remaining 7 miles built that year 82.3 per cent. were of vitrified pipe from 12 to 18 inches in diameter.

The length of brick and pipe sewers constructed within the next few years, with the relative proportion of each, is shown in the following table:

Description.	1864.	1865.	1866.	1867.	1868.	1869.	YEAR ENDING—			Total.
							April 10, 1871.	April 10, 1872.	April 10, 1873.	
	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	
Vitrified pipe, 18-inch diameter .....	.....	4,960	6,755	5,143	5,689	4,178	5,393	4,253	.....	.....
Vitrified pipe, 15-inch diameter .....	.....	12,938	9,203	18,865	24,670	14,004	17,899	26,231	.....	.....
Vitrified pipe, 12-inch diameter .....	1,591	10,052	22,424	33,810	43,689	40,917	31,786	6,271	.....	.....
Total length of pipe sewers .....	1,591	27,950	38,882	57,818	74,048	59,099	55,078	36,755	19,029	70.00 miles.
Total length of brick sewers .....	21,951	11,065	8,368	8,955	12,468	13,016	24,400	26,890	14,196	26.80 miles.
Total length of both .....	23,542	39,024	46,750	66,773	86,536	72,115	79,568	63,045	33,225	96.80 miles.
Percentage of pipe sewers .....	6.76	71.65	32.11	86.59	85.57	81.95	69.22	57.75	57.26	72.81 per cent.
Percentage of brick sewers .....	93.24	28.35	17.89	13.41	14.43	18.05	30.78	42.25	42.74	27.60 per cent.

Much of the work done at this time was in rock excavation. The 72,115 linear feet of sewers constructed in 1869 required the removal of 65,016 cubic yards of rock—nearly a cubic yard of rock for every foot of sewer.

The condition of the sewerage of New York in 1869, four years after the passage of the sewerage act, is thus described in the annual report of the department, which may be assumed to reflect the opinion of its chief engineer, General George S. Greene, and to give an inside view of the city as it appeared to those most familiar with all its details:

The system of sewerage which has been adopted by this board was recommended by the former chief engineer, Mr. Craven (after an experience of nearly twenty years as chief engineer of this department), and was determined on only after a careful study by him of the systems advocated and adopted in Europe, and especially in London, where the subject of a thorough and economical drainage has been extensively discussed and experimented on. It has worked well where it originated, and has, as far as we have experienced, without exception worked well here.

The cost of brick sewers as built under the old plan would be about three times that of the pipe sewers, which are their efficient substitute. In the matter of cleaning and repairs, the discrepancy is still greater.

There are now upward of 60 miles of these pipe sewers in operation in this city; instances of failure have been exceedingly rare, and in all cases they could be traced directly to unfaithful construction on the part of the contractor—a contingency from which no work is exempt.

The cost of repairing all of these defects in 60 miles of sewerage, so far as they have been repaired, has not exceeded \$3,000; and for cleaning and removing obstructions for the past year the cost has not exceeded \$500.

There are 261 miles of brick sewers in the city, for which the cost of cleaning and removing deposits for the past year has been \$27,730, showing that while the extent of the brick sewers is only four and one-third times that of the pipe sewers, the cost of cleaning has been more than fifty times greater.

The sanitary condition of any system of sewers, supposing them to be so constructed as not to foul the soil by leakage, may be considered to be in exact proportion to the rapidity and completeness with which all substances delivered into them are carried away and discharged. Sewers which require much outlay for artificial cleansing may safely be considered to be in bad sanitary condition. The more thoroughly the cleansing is effected by the natural dry-weather flow, without reliance upon the occasional flushing of storm-water, the better the sanitary result. All organic substances retained in sewers, even during the intervals between storms, decompose and generate foul and fetid vapors, polluting the air of streets and of adjacent houses.

The accompanying table, taken from the *Annual Report of the Department of Public Works* for the year 1873, shows the cost of cleaning and the amount of solid matter removed from the sewers from 1867 to 1872, no account being made of deposited matter removed during rain-storms.

In using this table to ascertain the comparative cost of cleaning brick and pipe sewers, it is to be considered that the pipe sewers are flushed from street-hydrants, and that solid matter thus washed from them is liable to be deposited in brick sewers below, whence it must be removed by the far more expensive process of carrying it out through the manholes in buckets by hand.

Year.	BRICK SEWERS.			PIPE SEWERS.			Proportionate length of brick to pipe sewers.	Proportionate cost of cleaning brick to pipe sewers.
	Total length in city.	Number of loads removed.	Cost of removal.	Total length in city.	Number of loads removed.	Cost of removal.		
	<i>Linear feet.</i>			<i>Linear feet.</i>				
1867(a).	1,058,136	13,073	\$32,682 50	150,022	50	\$125 00	7.05 to 1	261.46 to 1
1868....	1,068,817	19,358	48,295 00	222,020	80	200 00	4.81 to 1	241.48 to 1
1869....	1,088,911	11,092	27,730 00	288,127	200	500 00	3.78 to 1	55.46 to 1
1870....	1,120,234	18,548	40,420 00	335,313	597	1,442 50	3.34 to 1	32.18 to 1
1871....	1,152,054	17,374	43,435 00	346,903	502	1,255 00	3.32 to 1	34.61 to 1
1872(b).	1,158,870	By days' work.	12,924 39	355,108	By days' work.	1,488 50	3.26 to 1	8.92 to 1

a The extensive construction of pipe sewers was begun about 1865, and no considerable amount was paid for cleaning them until 1869. The cost given in the table for pipe sewers includes the expense for repairs, the removal of broken pipes when necessary, and relaying new ones. In all cases where the pipe sewers have required cleaning or repair, their failure to work has been traced directly to error or unfaithfulness in their construction.

b In 1872 special attention was directed to the pipe sewers to put them in thorough repair.

The following table, showing the expenditures for cleaning and repairing sewers from 1868 to 1879, requires this explanation: The "miles of sewerage" indicates not only the sewers proper, but also the culverts connecting the street-basins with these, and also several miles of underground mains, built to keep open the channels of old water-courses and to carry away the water from sunken lots, these sewage culverts carrying no foul sewage.

Table showing the cost of cleaning sewers in the city of New York from 1868 to 1879, with number of basins, etc.

Year.	Total.	Cleaning receiving-basins.	Cleaning sewers.	Repairing sewers, basins, and culverts.	Total miles of sewers, culverts, and underground drains.	Total number of basins.	Cost of cleaning sewers, per mile.	Cost of cleaning basins, each.	Cost of cleaning both sewers and basins, per mile of sewers.	Linear feet of sewers cleaned.
1868....	\$127,205 37	\$28,000 00	\$48,036 38	\$50,568 10	244.50	3,223	\$198 92	\$8 68	\$313 44	.....
1869....	126,719 59	24,000 00	28,379 53	76,340 06	201.00	3,372	101 07	7 12	103 03	.....
1870....	127,116 66	24,000 00	47,862 50	55,254 16	276.00	3,603	173 41	6 66	260 37	.....
1871....	237,308 12	48,000 00	31,272 50	158,035 62	205.00	3,764	106 01	12 75	268 72	.....
1872....	162,337 30	48,060 00	12,128 14	102,209 16	307.63	3,858	99 42	12 44	195 46	.....
1873....	129,552 71	48,000 00	16,933 25	64,619 46	323.16	3,973	52 40	12 08	200 93	.....
1874....	142,547 15	48,000 00	11,796 00	82,751 15	342.76	4,166	34 41	11 52	174 45	.....
1875....	177,325 64	48,000 00	12,348 89	116,976 75	351.66	4,252	35 12	11 29	171 61	.....
1876....	78,488 27	48,000 00	4,050 00	20,438 27	356.63	4,340	11 36	11 06	145 95	.....
1877....	51,035 69	15,950 00	4,620 00	30,465 69	302.39	4,397	12 75	3 63	56 76	.....
1878....	60,000 00	17,100 00	4,200 00	38,700 00	369.19	4,489	11 37	3 81	57 68	11,400
1879....	62,100 00	.....	.....	.....	371.60	4,524	.....	.....	.....	16,210

This table will be of value in comparing the expenditures of recent years with those of the time when the same work was done by contract. For instance, cleaning of basins at a uniform contract price of \$48,000 per year until 1876, is compared with 1877 and 1878, when the work was done by the city's own employes for about one-third the cost.

The government of New York city was reorganized by the charter of 1870, when a department of public works was organized, and a separate bureau was established for the sewerage and drainage of that part of the city included within the limits of Manhattan island. A few years later, the territory of the city was increased by the annexation of the Westchester district, but the drainage and sewerage of this district has been kept in a separate department. By an act of 1871, the department of public works was authorized, on the certificate of the board of health, to construct suitable drains in the beds of old water-courses and elsewhere.

In some parts of the city streets had been graded to such a height above the natural surface that the adjacent lots were left even below the level of the sewers, and could not, of course, be drained into them. The street-fillings divided the area into small squares, the natural drainage of which was cut off by the high embankment, and these squares became little better than so many reservoirs, receiving and retaining, until it became stagnant and foul, not only the natural drainage of the ground, but also the copious leakage of imperfectly laid sewers, especially pipe sewers with imperfect joints. This defective drainage of sunken lots became serious. A large area of the older portion of the city has been suffered to become and to remain saturated in the manner described, to the great depreciation of the value of property and to the general detriment of the public health. Even where culverts were nominally left in the courses of old brooks they have doubtless in many cases ceased to act. In this manner a large amount of land has become permanently wet, and the dwellings erected thereon have been pronounced by physicians to be in very bad sanitary condition.

Under authority of the act of 1871, many miles of underground drains have been constructed, and many hundred acres of land, formerly saturated with water and rendered unfit for occupation, have been permanently freed from moisture, increasing the salubrity of the district drained and largely benefiting the general health of the city, by removing a source of malaria which extended to adjoining districts. Many blocks in the upper part of the city, formerly wet and swampy, have now been drained, and have been brought into a high state of cultivation as market-gardens. The extent of this land-drainage up to the year 1878 is shown in the following table:

*Table showing the location and extent of land-drains, other than sewers, in the city, not including the Twenty-third and Twenty-fourth wards.*

	Length in feet.
Between Fifty-fourth and Fifty-fifth streets and Fourth and Madison avenues.....	442
Fifty-sixth and Fifty-seventh streets and Fourth and Lexington avenues.....	470
Fifty-sixth and Fifty-seventh streets and Fifth and Madison avenues.....	235
Fifty-seventh and Fifty-eighth streets and Fifth and Madison avenues.....	275
Sixty-first and Sixty-third streets and Fourth and Madison avenues.....	272
Sixty-second and Sixty-eighth streets and Eighth and Ninth avenues.....	4,012
Sixty-third and Sixty-seventh streets and Fourth and Fifth avenues.....	3,618
Sixty-second and Sixty-ninth streets and Boulevard and Hudson river.....	2,557
Sixty-sixth and Sixty-seventh streets and Madison and Fifth avenues.....	225
Seventy-first and Seventy-fourth streets and Boulevard and Ninth avenue.....	1,993
Seventy-second and Seventy-third streets and First and Third avenues.....	153
Seventy-third and Eighty-first streets and First and Fifth avenues.....	7,158
Seventy-sixth and Ninety-second streets and Eighth and Tenth avenues.....	9,602
Seventy-seventh and Eighty-eighth streets and Ninth avenue and Hudson river.....	6,388
Seventy-seventh and Seventy-eighth streets and First and Second avenues.....	567
Seventy-eighth and Eightieth streets and Second and Third avenues.....	662
Ninety-first and Ninety-third streets and Second and Third avenues.....	354
Ninety-second and One hundred and sixth streets and Third avenue and Harlem bridge.....	3,328
Ninety-sixth and One hundred and eleventh streets and Tenth and Eleventh avenues.....	4,674
One hundred and tenth and One hundred and twenty-fourth streets and Fifth and Eighth avenues.....	7,107
One hundred and seventy-third and One hundred and eighty-third streets and Kingsbridge road and Harlem lane.....	7,175
One hundred and fifty-third and One hundred and fifty-fifth streets and west of Eighth avenue....	361
On the line of Inwood and Dykeman streets.....	6,816
Built previously to the passage of the drainage act of 1871.....	5,000
Total.....	<u>73,444</u>

Total, January 1, 1879 = 13.91 miles.

These underground drains are usually of loose stone masonry, laid dry, with a view to the free admission of water from the adjacent lands, leading it to some sewer lying sufficiently low to receive its flow, or discharging directly into the rivers. It may perhaps be questioned whether underground drains made in this manner will permanently retain their efficiency, and where they deliver into sewers there may ultimately be danger of back-setting sewage passing through them to foul the ground they are intended to improve.

Further information in regard to the drainage and filling in of the Harlem flats will be found in the *Annual Report of the Board of Health of the City of New York*, December 31, 1875, pages 13 *et seq.*

*Drainage districts.*—The following information has been gathered concerning some of the principal drainage districts of Manhattan island:

**The West Seventeenth Street system:** The area on the west side of the city, between Fourteenth street and Thirty-fifth street, and between Broadway and the Hudson river, is almost entirely occupied with residences, manufacturing-establishments, and places of business. Here, too, are some of the largest hotels in the city. Here is concentrated within an area of about 1 square mile a population equaled by that of few American cities. Many streets of this district have the old 4-foot by 2-foot 8-inch sewers built between 1848 and 1865. The principal lines of drainage lead through Eighth and Ninth avenues to the Twenty-third Street sewer, an old culvert 8 feet 6 inches in diameter. In 1868 the sewers of this district above Twenty-third street were made to deliver into the sewer in Eleventh avenue, above described. The temporary outlet near Twenty-third street became a nuisance to the multitudes traveling by the Erie ferry, and the Albany and other boats plying from these wharves, and in 1873-'74 the improvement was continued, and the collecting-sewer was extended to Seventeenth street, taking in all the old sewers by the way. A large sewer was also built from Thirteenth street along Tenth avenue and Seventeenth street, thus concentrating the discharge of the whole district at one outlet, 10 feet wide and 5 feet 8 inches high, at the foot of Seventeenth street. The district so drained contained about 670 acres, with a density of population of about 175 per acre, or a total population of 116,780. The total length of sewers is about 27 miles.

On the 3d day of September, 1880, an observation was made of the effect of this enormous discharge upon the waters of the river. Not only was the water discolored, but its surface for a width of 200 feet was literally covered with floating matter coming from the sewer, and the copious discharge of gases bubbling to the surface.

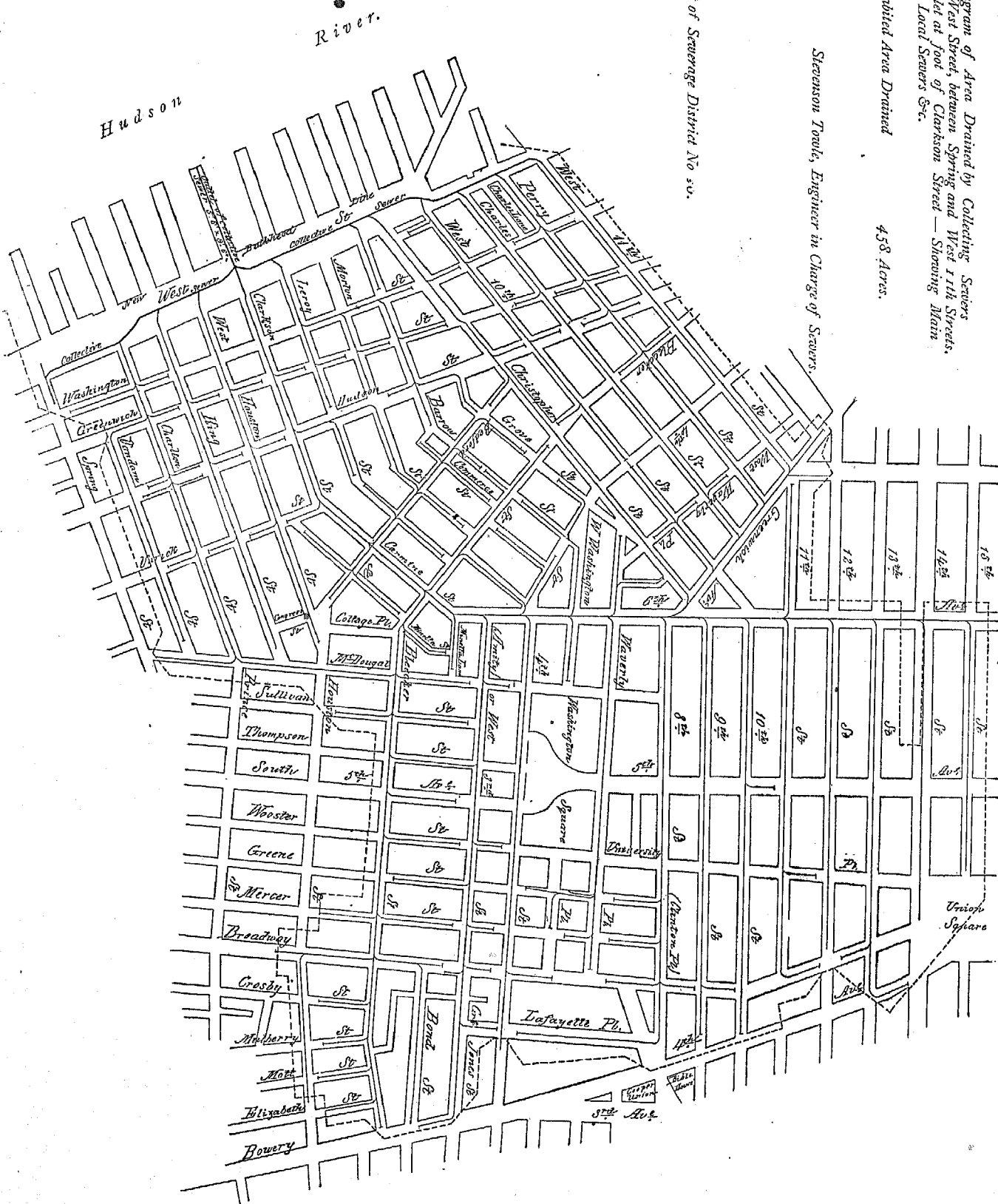
Diagram of Area Drained by Collecting Sewers  
in West Street, between Spring and West 11th Streets.  
Outlet at foot of Clarkson Street — Showing Main  
and Local Sewers &c.

Inhabited Area Drained

458 Acres.

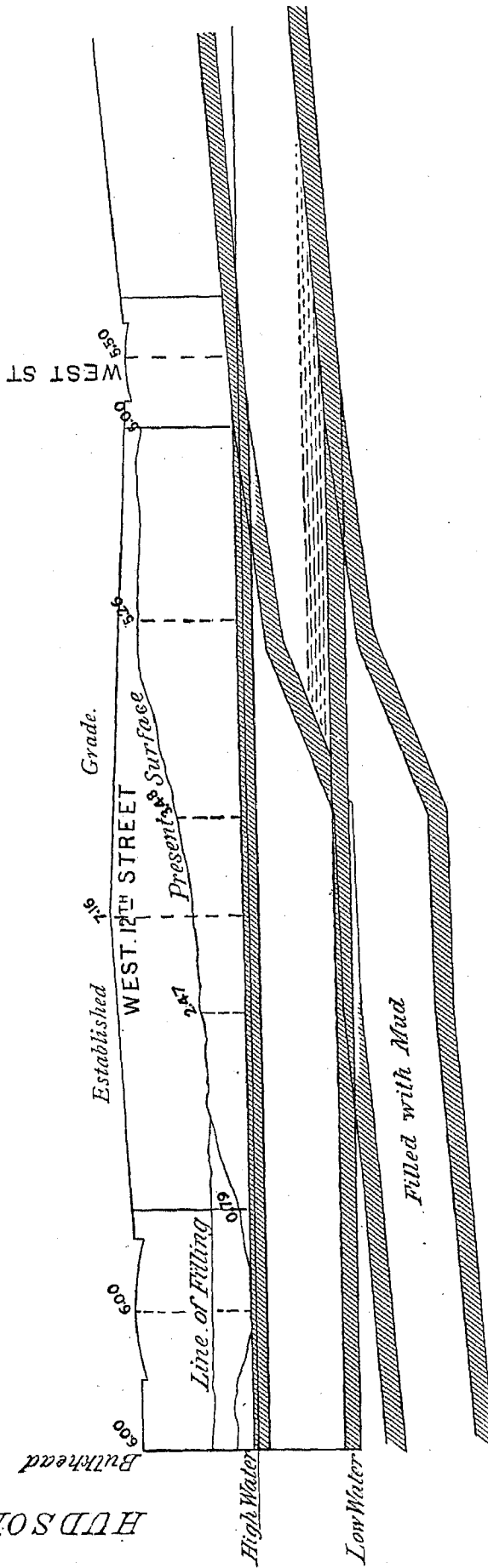
Steenenson Towne, Engineer in Charge of Sewers.

Part of Sewerage District No. 50.



SKETCH  
OF  
WEST 12TH STREET IMPROVEMENT,  
SHOWING  
REBUILDING OF SEWER FROM  
WEST STREET TO HUDSON RIVER.

HUDSON RIVER



indicated the decomposition of a serious accumulation of organic deposits at the bottom. This condition was doubtless due to the discharge of the sewer at the bulkhead line, and would probably be remedied by continuing the outlet to the head of the pier.

Between West Fourteenth street and West Eleventh street: An area of 114 acres is drained through six outlets, discharging into comparatively deep water. A large portion of this area is made land, the present bulkhead being about 1,000 feet beyond the original line of high water.

The Twelfth Street sewer had been the subject of complaint for several years, and was kept in working order only at much expense. It had been built on made ground, which had settled until the outlet of the sewer was entirely below low water for a distance of 500 feet back from its mouth. The outflow of solid matter was retarded until the sewer became entirely obstructed. The only outlet for the drainage of 200 acres was then through house-connections into the cellars until temporarily relieved by the removal of the deposit by hand. A new sewer was constructed in 1872 to replace this settled outlet.

Between West Seventeenth street and Canal street the shore is occupied by the piers and wharves of the great European steamship companies, the Hoboken ferry, and the Morris and Essex Railway Company. The improvements made by the department of docks are well advanced at this point. A masonry wall has been constructed and the increased space filled in, giving West street a width of 250 feet. A large collecting-sewer has been contracted for and is now in process of construction. The old sewer in Clarkson street, 6 feet high by 8 feet wide, drains 324 acres through 13 miles of sewers. The principal drainage line for this district is along the general course of the former Minetta brook, its natural drainage outlet. The average population of the wards on which this district lies is 166 per acre, and the population of the district may be assumed to be about 54,000.

The collecting-sewer now building will cut off eight outlets on the north, with an area of 76 acres, and four on the south, with an area of 58 acres, thus eventually concentrating at one point the drainage of 458 acres, with a population of 66,000, and a total length of sewer of 19 miles.

Sewage delivered by the Clarkson Street intercepting sewer is now carried through a wooden box, constructed for the purpose, under the wharf of the Cunard Steamship Company to the head of the pier, nearly 600 feet from the bulkhead line, where it discharges into deep water, and has caused no discomfort or annoyance, so far as can be ascertained.

The subsoil drainage of this district, and of others along the border of the city to which the method of improvement now being carried on by the department of docks is to be extended, has been amply provided for. The character of this work, as affecting the drainage question, is thus described by George S. Greene, jr., esq., C. E., chief engineer of that department:

"The improvement of the water-front of the city of New York, which has been completed for a continuous stretch of 3,000 feet between Canal street and West Tenth street on the Hudson river, consists of building a river-wall 180 feet west of the old line of West street, filling in behind it and making a marginal street of 250 feet in width, including the old West street, and of the building of twelve piers or wharves varying in width from 50 feet to 80 feet, and in length from 536 feet to 595 feet. In all this work due consideration was given to sanitary requirements, as well as to all others.

"The river-wall is built of masonry, 24 feet in height, and extending from 5 feet above mean high water to 15 feet below mean low water. This masonry wall rests upon piles.

"The general method of construction of the wall was first to dredge out the softer mud until hard mud or sandy mud was reached, then to fill in the trench nearly to the height of bottom of masonry with coarse gravel and small cobble-stones.

"The piles were then driven into and through this bed of cobbles and gravel as long as they would stand driving without destruction.

"The masonry was then placed upon the piles, and long slopes of riprap stone extended from the structure in front and rear.

"This wall is intended to be the permanent boundary between the land and the water. Its masonry is of the best granite and Portland cement concrete, and its wooden foundations are insured against decay by being so placed as always to be wet. They are carefully protected against attacks of the teredo, or other marine destroyers of timber.

"Upon completion of the wall, the filling in behind it back to West street and the building of the piers proceeded simultaneously.

"The piers are of timber with pile foundations, and are intended, generally speaking, to last as long as the changing demands of the commerce of the port can advantageously use piers of their present size and position.

"The filling behind the wall consisted, near the walls, always of clean and sandy earth or loam; back of that ashes, street-cleaning dirt, etc., was used to within about 3 or 4 feet of the surface, and the upper 3 or 4 feet was always of clean earth, loam, or sand.

"The filling was then allowed to stand for three years, and then covered with a pavement of granite blocks 8 inches deep, with the joints filled and cemented tight with a mixture of coal-tar and gravel, similar and equal to the best pavement of that kind in Washington. This pavement is practically water-tight, and all dirt or filth deposited upon it must remain upon its surface until cleaned off. It can not make its way underneath the pavement or into its joints.



"The question of the flow of water through this filling and drainage of the upland into the river beneath the surface was settled by running a self-registering tide-gauge 23½ feet inside the face of the wall for several months, and another 80 feet inside the face of the wall at a time when the wall and filling behind it had been completed for three years, and comparing their records with that of another self-registering tide-gauge placed outside the wall in the immediate vicinity of the others.

"This comparison showed that at the point 80 feet inside the wall the water rose and fell about 1 foot less than it did outside the wall, while at the point 23½ feet inside the wall the difference of rise and fall was only about two-tenths of a foot from that outside the wall."

The Canal Street system is one of the largest of the old sewer systems, lying principally between Spring, Bleecker, Bowery, Canal, and North streets and the Hudson river.

The old Canal Street sewer is about 14 feet wide and 6 feet high, with bottom and sides of stone and arch of brick. It drains an area of 362 acres through a total length of 16 miles of sewers. The flow of water through the main is large and rapid, and the pier keeps itself clear except during dry seasons. In October, 1880, deposits had begun to accumulate above Thompson street. The branch sewers of this district have little or no fall; those in Thompson, Broome, and Spring streets, and in South Fifth avenue and elsewhere, collect deposits, causing water to back up and at times to flood the cellars of houses. An examination of the Thompson Street sewer, made October 13, 1880, showed the bottom to be covered with a soft deposit, in which the feet would sink to a depth of 12 inches or more without reaching hard bottom. A channel was being dug through this deposit to the Canal Street sewer, the floor of which was found to be 8 or 10 inches higher than that of the Thompson Street sewer, which discharges into it. Farther up the sewer, where no cleaning had been done, the deposit was found to be more than 2 feet deep, with a depth of about 3 inches of water flowing over it. The height of the sewer at this point is 5 feet, and the rapidly increasing depth of deposit rendered traveling difficult. The flow on top of the deposit is rapid, but, being distributed over a width of 4 feet, has little effect in removing the deposit, which was at the time being taken out by hand. During storms the flow is further obstructed by gas- and water-pipes, which pass through the sewers obliquely in different directions. At one point a 6-inch gas-pipe and a 12-inch water-main cross the sewer very near each other. These pipes were covered with thick deposit, showing that they had been covered at storm-floods. Most of the sewers discharging into this main are the large brick sewers of old construction, about 800 feet of new work being of 12-inch vitrified pipe. This district reaches into the Tenth ward, which in 1880 had an average population of 432 per acre, being at the rate of 276,672 per square mile. The drainage of the Canal Street district is brought through 16 miles, with sewers distributed over an area of 362 acres, having an average population of 84,346. The discharge is into a single slip, which is occupied by the ships of the Pacific Mail Steamship Company and the vessels of other important lines. For hundreds of feet along the river each way from this point, bubbles of gas are constantly rising from the decomposing matter at the bottom. This condition will doubtless be remedied when the plans of the department of docks shall have been fully completed at some future time. When these works are completed the total area of which the sewage will be discharged at Canal street will be 434 acres.

The condition of the lower part of the west side of the city, and the means to be undertaken for its relief, are not substantially different from those described above.

The report of the investigation of this district contains the following:

Several years ago it was noticed that Washington market was very damp, and that very disagreeable odors arose from the floors, indicating bad drainage. An examination showed that the drain was useless, being obstructed in some places and broken in others, and the whole ground beneath the market was found to be saturated to a depth of several feet with waste drippings from the stands of fish-dealers and others using ice. The matter was taken in hand at once, and in 1872 the mud was all removed and the whole market sowed without interruption to business, the work being done mostly at night. The effect of this improvement was noticed in the better preservation of meats, vegetables, and fruits, as well as in the improved condition of the atmosphere.

This improvement, so successfully accomplished, affords a most striking comment on the great necessity, as well as the comparative facility with which the drainage might be improved in all that district, from which not only New York, but many of the cities and towns along the Hudson, derive their supply of daily food.

The following table relates to the district below Duane street:

*Table showing the names of streets between Duane street and the Battery in which are outlet sewers, and the area drained by each.*

Streets.	Drainage area.	Streets.	Drainage area.
	<i>Acres.</i>		<i>Acres.</i>
Warren street .....	3.46	Liberty street .....	6.06
Murray street .....	18.19	Cedar street .....	6.06
Park place .....	2.60	Albany street .....	2.60
Barclay street .....	27.72	Carlisle street .....	0.86
Vesey street .....	18.19	Rector street .....	19.93
Fulton street .....	2.16	Morris street .....	5.20
Day street .....	3.03	Battery place .....	8.66
Cortlandt street .....	10.86	Total number of acres drained.	135.08

The drainage of the area east of the Battery, at the beginning of the East river, is partly through the Broad Street sewer, already described, and partly through an outlet delivering at Whitehall street. All this region is but little above tide-level, and is largely made ground. All outside of Pearl street, including Water, Front, and South streets, has been reclaimed from the river. These sewers are flooded at high tide, and their outlets are into docks filled with canal-boats and other vessels, which obstruct the free dissemination of the sewage. The same condition as to sewers and shore continues without important changes for a long distance up the East River side of the city. The sewer at Maiden lane, for instance, has a rapid and strong flow as far as William street, and a good flow to Gold street, while below Pearl street it is blocked by the tide.

The outlets and drainage areas of sewerage from the Battery to the Brooklyn bridge are shown in the following table:

Streets.	Drainage area.	Streets.	Drainage area.
	<i>Acres.</i>		<i>Acres.</i>
Whitehall street.....	13.8	Burling slip.....	19.1
Broad street.....	38.1	Fulton street.....	22.6
Old slip.....	12.1	Peck slip.....	40.3
Wall street.....	9.1	Dover street.....	1.3
Maiden lane.....	25.6	Total number acres drained...	182.0

From the Brooklyn bridge to the foot of Grand street the character of the river-front is different from that already described. The river is narrow and the current strong; the piers extend but little way into the stream, the shores are more bold, and the strip of reclaimed land is narrower. The drainage is concentrated at two principal points, having their outlet at Roosevelt and Jefferson streets, the former, draining a district which reaches to Chambers street, Broadway, Canal street, and the Bowery, containing 85 acres. Add to this an adjoining area of about 53 acres more. The rate of population is about 250 per acre, and the population of the district is about 35,000—the outlets all being concentrated in the slips of the Roosevelt, Hunter's Point, and Catherine ferries.

The water of these sewers is unusually dirty, the gas, steam, and vapors escaping from the manholes when uncovered being extremely offensive. The condition of the streets, pavements, gutters, and inlet-basins is exceedingly foul, and the whole sanitary condition of that part of the city, as indicated by external appearances, is bad beyond description.

The principal outlet for the next considerable drainage district is at Jefferson street. In this district lies the old fashionable quarters of East Broadway, Madison street, etc. It has now fallen to tenement-house use, the population of the 126 acres drained to Jefferson, Rutgers, and Pike streets being no less than 40,000 people. The sewers are, mainly owing to the greater elevation and better fall, and perhaps somewhat to the fact that they were built at a time when the district was occupied by the better classes of the population, in much better condition than those farther south.

The outlets and drainage areas of sewers between Brooklyn bridge and Grand street are shown in the following table:

Streets.	Drainage area.	Streets.	Drainage area.
	<i>Acres.</i>		<i>Acres.</i>
Roosevelt street.....	84.9	Jefferson street.....	85.8
James street.....	20.8	Gouverneur street.....	25.1
Oliver street.....	20.8	Jackson street.....	9.5
Catherine street.....	12.1	Corlears street.....	17.3
Market street.....	22.5	Cherry street.....	4.3
Pike street.....	15.6	Total number acres drained...	343.8
Rutgers street.....	25.1		

From Grand street to Houston and Third streets the system of drainage is of the simplest sort, each street leading to the river having its own sewer, usually with a length of nearly 1 mile, and with good fall. The flow is rapid and strong as far as to the made ground, about 1,000 feet from the river. Here the sewers are blocked by the tide.

A sewer here affords a good opportunity for observing the manner of making house-connections. The plumber or workman knocks a large hole in the side of the sewer at any convenient height, and introduces the usual 6-inch pipe. The hole is bricked up from the outside, the interior being left rough and uneven, and in some cases apparently without mortar or cement. The rubbish and bats are left inside of the sewer, forming an obstruction to the flow, and causing deposits of solid matter both above and below. These remain until discovered and removed by the workmen of the sewer department. In one place near Lewis street the sewer has fallen somewhat out of shape, and has been strengthened by interior wooden bracing. It seems to have been built with lime mortar, which

has almost entirely disappeared, the joints of the sides and top being open for a considerable distance in from the face of the work. In other places the spaces left on the removal of the mortar seem to have been closed by a squeezing together of the wall, reducing somewhat the size of the sewer. At one point the sewer had settled out of grade, and there the flow of water was retarded and some solid deposits had formed, but otherwise the interior was found to be clear and the flow was good.

This sewer formerly delivered into the basin of the Williamsburg ferry at Houston street, where it became the source of great offense. It has now been extended beneath the wharf and discharges into deep water. The construction of this outlet is shown herewith.

The half-mile of river-front lying between Grand and Third streets receives the drainage from 342 acres, which small area holds more than one-tenth of the entire population of New York city.

The outlets and drainage areas of sewers from Grand to Third street, east of the Bowery, are shown in the following table:

Streets.	Drainage area.	Streets.	Drainage area.
	<i>Acres.</i>		<i>Acres.</i>
Grand street.....	11.3	Stanton street .....	52.0
Broome street.....	48.5	Houston street.....	84.9
Delancy street.....	66.0	Third street .....	34.0
Rivington street.....	45.0	Total number acres drained...	342.3

Two trunk-sewers, each 6 feet by 7 feet, delivering at the foot of Fourteenth street, drain the district about Tompkins square, and as far west as Third avenue. This is a densely populated district, but in better condition than the one just described. These main sewers have a sluggish stream and some deposit, but nothing of a very objectionable character. They receive on the line of avenue C the sewers coming from the west. The examination of this district showed the following curious instances of miscalculation or inefficiency: At First avenue, between Third and Fourth streets, the pipe sewer on the east side was found to contain several inches of fine clear sand, with only water enough to keep it moist. The sewer on the west side was perfectly dry, as if no connection had been made with it, although running in front of a solid block of high houses. What becomes of the drainage of these houses could not be ascertained.

The district drained by the Fourteenth Street outlet covers 271 acres, with a population of about 90,000. At East Eighteenth street there is an outlet of a sewer draining the district lying about Stuyvesant park, Union square, and Gramercy park. The main sewer is 6 feet high and 8 feet wide; the whole area drained is about 250 acres, with a population of about 148 per acre.

At East Twenty-third street there are two outlet-sewers, one 5 feet by 4 feet, and the other 4 feet 6 inches by 3 feet 6 inches, draining together an area of about 320 acres, extending as far west as Sixth avenue.

A recent examination of the Twenty-third Street sewer showed it to be clear, with a strong and rapid flow of water.

In Madison avenue, between Twenty-sixth and Thirtieth streets, a large amount of sand and gravel has accumulated, said to have been caused by a break that had recently occurred. The depth of the obstruction is from 1 to 1½ foot. It has caused a deposit to form in some of the side sewers, and has occasioned much inconvenience.

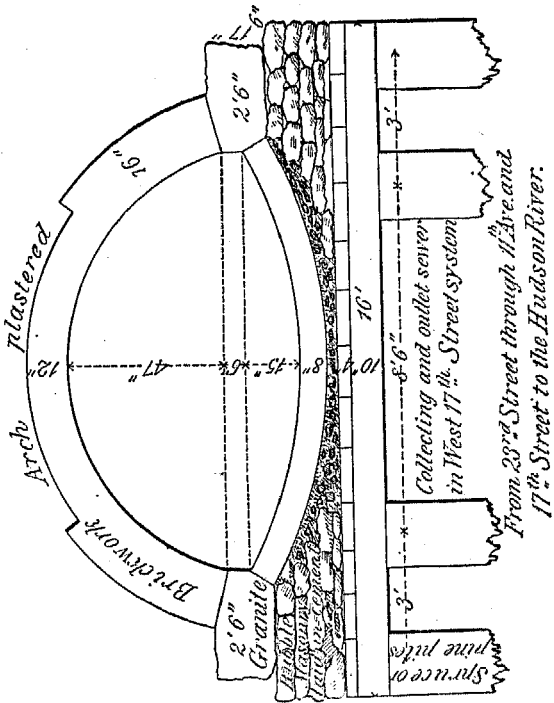
Workmen have been employed during the summer removing this obstruction by a slow and expensive process. Only one man can work in the sewer at a time, and the sand has to be removed in buckets through the manholes. The ordinary flow of the sewer runs slowly through a crooked channel cut in the deposit about 8 inches wide by 6 inches deep.

The condition of other sewers in this district, which carry a good flow, and which are thereby kept clean, is comparatively inoffensive. At East Twenty-third street is the outlet of a trunk-sewer 8 feet by 5 feet 6 inches, which drains an area of about 300 acres, not extending beyond Fifth avenue. The eastern part of this district is low, the surface-drainage is not good, and the gutters and pavements are obstructed with mud and rubbish. The population and general appearance of this section bear a close resemblance to those of the lower parts of the city, save for the absence of the great provision, fruit, dry-goods, and clothing establishments, and of the great manufacturing industries which occupy whole buildings on the west side of the city. The west portion of the section along Fourth and Fifth avenues is, on the contrary, of the very best character, so that this sewer district illustrates almost the two opposite extremes of New York life.

In the *Annual Report of the Department of Public Works* in 1872 it is said:

Many complaints were made after heavy rains by residents on Thirty-third street, between Second and Third avenues, and on Third avenue from Thirty-first street to Thirty-fourth street, of the overflow, through the house-connections, into the cellars of buildings. On examination, the evil complained of was found to be caused by the incapacity of the Thirty-third Street sewer east of Second avenue; this was remedied at a very trifling cost, by constructing an overflow from the sewer in Thirty-third street into the old sewer in Second avenue, which empties into the Thirty-fourth Street sewer. This alteration has permanently relieved the Thirty-third Street sewer of all surplus water during heavy storms.

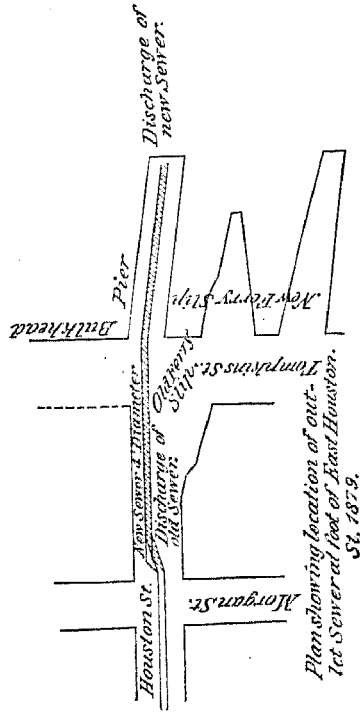
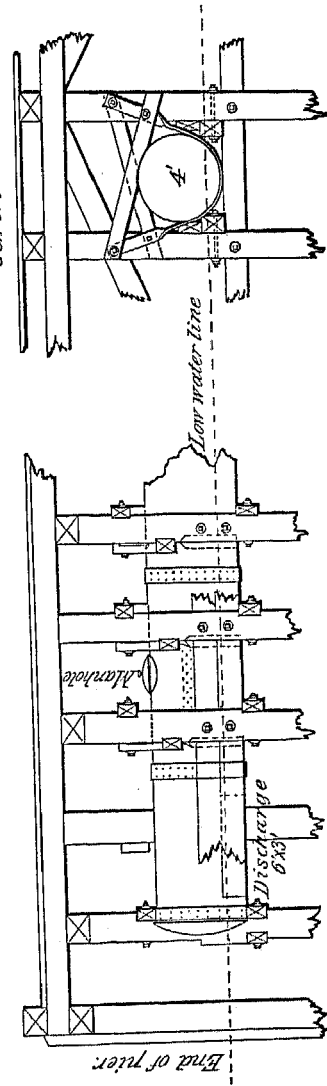
10'x5'-8" 1776 feet long.



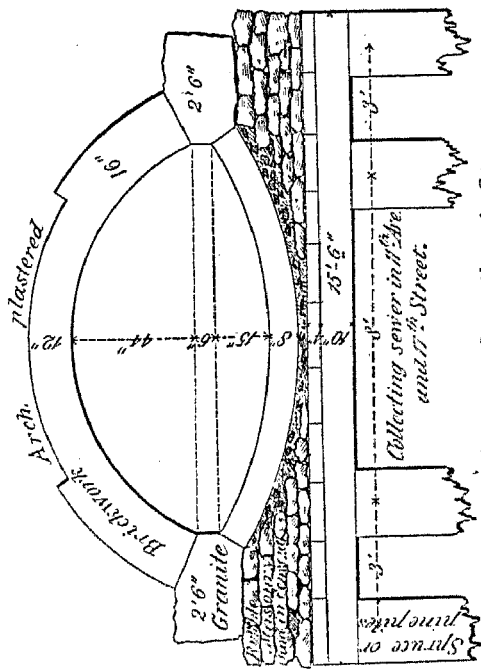
# WEST STREET COLLECTING SEWER, NEW YORK.

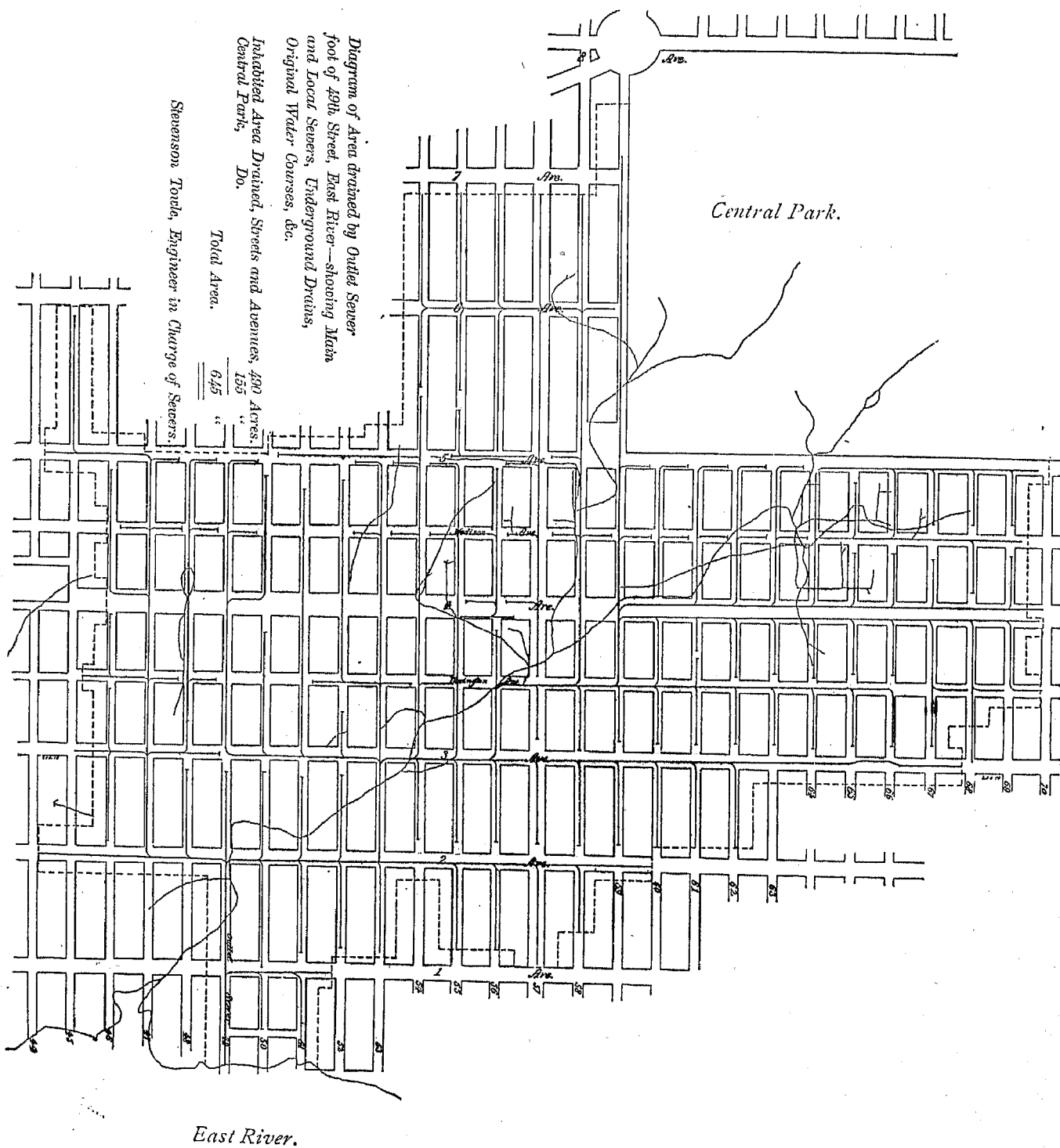
Galvanized wrought iron sewer through pier-foot of Houston  
St. East River, discharging into tideway below low water.

Section showing manner of  
protecting and supporting  
sewer.



9'6"x5'5" 454 feet long.





The arrangement of the overflow described is as shown in the cut.

At the foot of East Forty-second street is the outlet of a 6-foot sewer, built under that street from Third avenue to the East river. Its construction was made necessary by great damage done by flooding during heavy rains, along Third avenue and adjacent streets, from Fortieth street to Forty-sixth street, a former outlet in Thirty-ninth street being inadequate.

The peculiarities of the construction of this sewer are shown in the accompanying illustrations. It is built for a great part of its length in tunnels through solid rock, in some places 60 feet below the surface. The cuts show plans and profiles of the work, with cross-sections indicating the manner of construction, in tunnel, in open rock-cut, in open earth-cut, and on made land; also the manner of connecting old sewers with the main by a manhole-drop.

As this outlet is above tide-water, and is at times exposed to strong easterly winds which would force ordinary house traps, a trap has been made in the main sewer itself. This has worked in a perfectly satisfactory manner, and, owing to the heavy grade of the sewer, the trap remains clean. During storms large stones are carried through it with great force.

At the time of the census examination, October, 1880, the flow of water was about 6 inches deep, and was so rapid that it was difficult to maintain a footing on the clean and slippery bottom. This sewer takes the drainage of about 140 acres, extending as far west as Fifth avenue, and lying between Thirty-ninth and Forty-fifth streets.

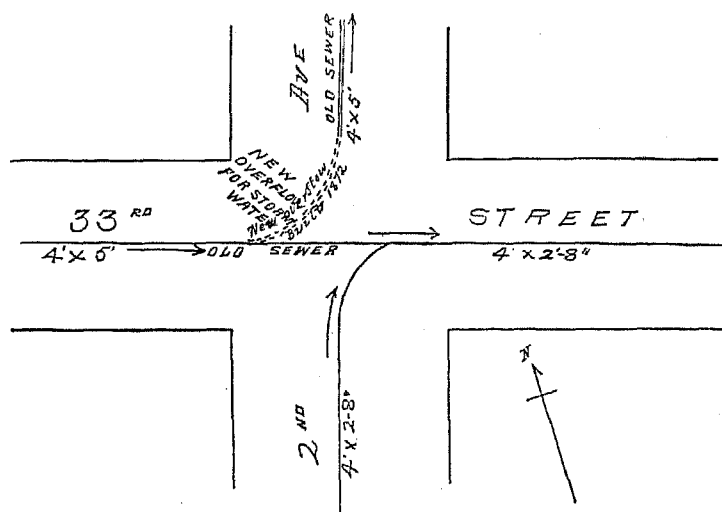
At East Forty-ninth street is the outlet of a trunk-sewer, built in 1854, 9 feet by 8 feet 6 inches in size. This is the outlet of the brook draining the pond at the southeast corner of Central park, which has now been carried into sewers through Fifty-ninth street, Lexington avenue, Fifty-sixth street, Third avenue, Fifty-third street, Second avenue, and Fortieth street to the river. The district drained contains about 580 acres. It is separated from the Yorkville district by a rocky ridge crossing Second avenue obliquely in a northwesterly direction, near Sixty-first street.

This district is sewered largely with sewers of recent construction, many of them being of pipe. The original topography of the ground was very uneven. Some parts have been deeply filled, and others have been graded down from considerable heights.

It was concerning this district that a sensation was created early in 1880, by information developed from interviews of reporters with Judge Davis and others. Careful examination developed an astonishing condition of drainage work, not so much in the sewers themselves as in the house-connections. For example, a number of fine large dwellings on Fifty-seventh street had their house-connections extended only as far as the curb-line, the matter discharged being poured into the loose rock-filling of the street, finding its way thence down to the bed of the old natural depression, without entering the sewer at all. In Fifty-sixth street, house-connections had been laid on coarse rock- and earth-filling, and had been broken and destroyed by the settling of the ground so that their flow could not reach the sewer. During the investigation made by officers of the department of sewers, the bath- and laundry-tubs of several houses were discharged simultaneously, but not a drop of their flow made its appearance in the sewers. These defective house-connections have now been replaced, and it has been found that the heaviest iron pipes are required in such situations to resist the unequal settlement of the deep filling. The instances cited are by no means exceptional, but are given only as examples, and show that defective drainage work is not confined to the poorer class of houses.

Examinations made during continued dry weather in the pipe sewers of this district developed less deposit than was expected. The sewers are, indeed, in more than fairly good condition. There would occasionally be found in a pipe from 12 to 18 inches in diameter a deposit of several inches of sand, carrying a tolerable flow of water through a double channel, the sand being highest in the middle, with a curve at each side uniting with the curve of the pipe.

On the west side of the city a large district between Thirty-fifth street and Fifty-ninth street, and west of Fifth avenue, is drained to the Hudson river through several distinct outlets, the principal one being a trunk-sewer 8 feet 6 inches in diameter in Forty-second street. The original shore at this point was near Eleventh avenue, where a natural stream, which had its source near the southwest corner of Central park, discharged through a marshy inlet, and flowed thence along the general course of Broadway and Seventh avenue to Forty-sixth street, where it received several branches, and continued in an irregular course across the streets and avenues to its outlet at the foot of West Forty-second street. Much of this district is from 60 to 90 feet above tide-level. The steep grades secured by these elevations would seem to insure good drainage, but for many years much trouble has been experienced, and several changes in the drainage system have been necessary, the storm-flow being diverted from





sewers which were inadequate for its conveyance, and turned by bulkheads and overflows partly to other outlets. For example, at Eighth avenue and Fifty-fourth street an ordinary flow is conducted along Fifty-fourth street, Ninth avenue, and Fifty-first street, and thence to the river; while a storm-flow is diverted, the excess passing down Eighth avenue, Forty-fifth street, Ninth avenue, and Forty-second street to the river. Similar changes have been made at other points in this district. The drainage of the district lying between Thirty-fifth and Forty-second streets, and between Sixth and Ninth avenues, previously to 1858, was through Eighth avenue to Twenty-third street, and thence to the Hudson river. During every storm the cellars on Eighth avenue, from Thirty-fifth to Thirty-ninth streets, and in intersecting cross-streets for a considerable distance, were flooded. The Croton Aqueduct board, then in charge of the sewerage, attempted to remedy this evil by reversing the flow of the Eighth Avenue sewer—so that it ran in the opposite direction—from Thirty-fifth to Thirty-ninth street, and thence through Ninth avenue and Fortieth street to an old sewer in Tenth avenue, and thence to the large outlet-sewer in Forty-second street. These expensive changes, occupying several years, and finished in 1862, did not afford the expected relief, for the old sewer in Tenth avenue could not carry the increased drainage. The Thirty-ninth Street sewer between Eighth and Ninth avenues was also too small. In Eighth avenue, between Thirty-fifth and Thirty-ninth streets, and also on cross streets on both sides of Eighth avenue, water from the sewer in times of heavy rains still rushed through the house-connections as before, into basements and cellars, filling them to a depth of 2 or 3 feet with dirty water, causing great damage to property and danger to health. To remedy these serious evils it became necessary to build a new sewer in Tenth avenue, between Fortieth and Forty-second streets, and also to direct the drainage from Eighth avenue and Fortieth street, through Fortieth street to Ninth avenue. This finally brought relief to a large area of thickly built-up territory, the owners of which had been compelled to suffer for more than fifteen years in consequence of the errors of the old system—or lack of system—of sewers.

This has been described at some length to illustrate the difficulty, delay, expense, and inconvenience attending efforts to remedy and patch up an old and defective system of sewers.

In the course of the examinations of this district there were found several instances of what frequently occurs, where a pipe sewer was largely obstructed by rubbish which had been thrown down the manhole from the surface of the street, parts of the same material having rotted on the steps and on the masonry beneath the cover. This easy method of disposing of rubbish by private street-sweepers, and for the concealment of objects of which it is inconvenient to be found possessed, is by no means uncommon, and it constitutes one of the serious objections to the use of manholes.

The district lying between Central park and the Hudson river, with an area of about 1,000 acres, is of very irregular formation, and is largely in a state of nature so far as its grades are concerned. The avenues are graded, but few of the cross-streets are yet completed. So far as its drainage is concerned, it is divided into two or three principal districts, that from Seventy-seventh street discharging through Tenth avenue, Seventieth street, and Eleventh avenue, uniting with a sewer from Ninth avenue and Sixty-seventh street, and from Eighth avenue to Sixty-fifth street. These discharge through a 4-foot sewer near the grain-elevator of the New York Central railroad. The next district discharges through an outlet of 5 feet 7½ inches by 5 feet at Eighty-first street. The next delivers at Stryker's bay (Ninety-sixth street). This sewer is 6 feet 9 inches by 6 feet, and was constructed in 1873.

Underground drains have been quite extensively constructed for the soil-drainage of this district, being designed to remove surface- and soil-water only, but not sewage. They are constructed of loose masonry, and are subject to the comment previously made concerning such structures.

These drains have been built chiefly in the following localities:

	Feet in length.
Between Sixty-second and Sixty-eighth streets and Eighth and Ninth avenues .....	4,012
Sixty-second and Sixty-ninth streets and Boulevard and Hudson river .....	2,557
Seventy-first and Seventy-fourth streets and Boulevard and Ninth avenue .....	1,993
Seventy-sixth and Ninety-second streets and Eighth and Tenth avenues .....	9,602
Seventy-seventh and Eighty-eighth streets and Ninth avenue and Hudson river .....	6,388
Ninety-sixth and One hundred and eleventh streets and Tenth and Eleventh avenues .....	4,674
Somewhat more than 5½ miles in all.	

The district east of Central park is much more closely built up, and will soon become a densely covered portion of the city. That portion of this district lying south of the rocky ridge is drained through the Forty-ninth Street sewer into the East river, as already described. The narrow strip of land to the east is drained by short sewers leading direct to the river. About 100 acres of the area delivers through a 6-foot sewer at Sixty-second street, another 6-foot sewer discharging at Seventy-fourth street, and a 5-foot sewer at Seventy-ninth street.

A considerable area between Seventy-third and Eightieth streets, and between First avenue and Fifth avenue, is naturally below the grades of the streets, and many lots were submerged to a considerable depth, until land-drains were constructed to the extent shown in the following table:

	Feet in length.
Between Seventy-second and Seventy-third streets and First and Third avenues .....	151
Seventy-third and Eighty-first streets and First and Fifth avenues .....	7,158
Seventy-seventh and Eighty-second streets and First and Second avenues .....	567
Seventy-eighth and Eightieth streets and Second and Third avenues .....	662
Making a total length in this distance of .....	8,538

Running through Eighty-sixth street from Lexington avenue to the East river is a sewer of old construction, laid on a very steep grade and carrying the most rapid stream that was observed in the examination of the sewers of the city. A 5-foot sewer delivers at Eighty-second street, draining a district of about 80 acres. A large part of this area is still unoccupied, and some of the streets are not graded, the manholes of the sewers standing up above the level of the ground like the chimneys of a ruined village. From Eighty-sixth street the slope is toward the north, to what is known as the "Harlem flats", the descent between Third avenue and Central park being precipitous, the lots being mostly rough and rocky and but little improved. The easterly side of Third avenue is for several blocks sustained by a wall which in places reaches a height of 30 feet. At Ninety-eighth street the low land extends to the west side of Third avenue. The low and formerly marshy district beginning at Harlem river extends along the general course of One hundred and sixth street to Central park, where its headwaters have been converted into what is known as Harlem lake, in the northeast corner of the park. The drainage from this lake now runs down One hundred and ninth street to First avenue, thence to One hundred and fourteenth street to avenue A, and finally to the Harlem river at the foot of One hundred and sixteenth street. The reclamation and drainage of these low lands, the natural outlet of which was cut off by the grading of the streets and avenues, was a difficult problem. The question of jurisdiction, and of the ability of the city to appropriate money or to lay assessments which would not be vacated by the courts, are all set forth in the numerous resolutions, petitions, messages, and correspondence collected in the report of the board of health, December 31, 1875. Some of this low ground has been filled with ashes and street-sweepings, with a surface-covering of clean earth. Disinfectants have been freely used on the filling, and in some places on the original low ground where found to be offensive. Some of the filling has settled away and has had to be replaced. At the present time (November, 1880) many of these lots have been so improved by drainage and filling that their former condition is obliterated. Many are now occupied as market-gardens, and dwellings are rapidly extending over the area.

Between One hundred and fourth and One hundred and fifth streets east of First avenue the ground is being filled with the contents emptied from ash-barrels, and brought there by the carts of the police department. An army of hard-working scavengers—men, women, and children, mostly Irish and Italian—industriously handle over the ashes and rubbish as soon as dumped, and pick out every thing that can be sold for old junk, or that can be fed to hogs, goats, and cows, and carry it away in wheelbarrows, bags, baskets, and goat-wagons to their shanties, not far away. Ashes so carefully picked over appear to make a very good filling; but the process has cut off the natural drainage, so that the block between One hundred and fourth and One hundred and fifth streets, from First avenue to Harlem river, is overflowed with stagnant and dirty water to a depth of 10 to 15 inches, some of the shanties actually standing in the water.

Two large drainage districts between Eighty-ninth street and Mount Morris park discharge at One hundred and sixth street and One hundred and tenth street, the latter being 8 by 12 feet in size. The two together drain an area of about 850 acres. The northern boundary of the district is a rocky ridge, extending from One hundred and sixteenth street and Third avenue through Mount Morris park, thence away toward the northwest.

The sewers of this district—pipe sewers as well as brick sewers—owing to their slight fall, have considerable deposit and a sluggish flow—a flow which is in some cases obstructed by high tides.

The district about Carmansville, and generally north of One hundred and tenth street on the west side of the city, has as yet hardly attained such importance in the matter of sewerage as to justify a description here.

The drainage of Harlem, like that of much of the lower part of the city, belongs to what is known as the "old system", the original settlement of this part of the island being almost as ancient as that of New York below Fourteenth street; and both have grown up under the influence of the same methods of public improvement.

The division of the different drainage districts of the whole island is sufficiently shown by the accompanying map, prepared for the purpose.

The following comparison is made between the old and the new systems of drainage in New York:

*The old system.*—That known as the "old system", lying chiefly below Fourteenth street, but partly also in Harlem and Yorkville, is characterized, first, by the great variety of its shapes and sizes, entirely unsuited to the amount of duty required of them, as they were built with no knowledge of what would eventually reach them; second, by the great number of outlets, every sewer taking the most direct course to the river. The lack of suitable foundation under the sewers built in made land or on soft ground caused them to settle out of shape and to collect deposits, and many of them were in a condition to cave in at any moment.

In the brick masonry built before hydraulic cement came into use the mortar (probably of shell lime) has almost entirely disappeared from the joints, and the sewers retain their general shape by pressure, though somewhat reduced in size. The masonry is often a mere shell of dry bricks, held in position by the compacted earth inclosing it.

*The new system.*—Some of the leading characteristics of the new system are these: First, the large proportion of pipe sewers as compared with those made of brick; second, the construction of large collecting-sewers along the water-front to receive the discharge of the sewers in each street and lead it to convenient points of outlet. The success of this system in spite of the low grades available may be considered as established in the sewers built along the shore of the Hudson river below Thirty-fourth street; third, the plan of discharging the sewers at the

pier-heads, and delivering their outflow into deep and moving water. This is hardly more than a makeshift, but it is a very good makeshift in the absence of a distant outlet for the foul sewage of the city. Notable instances of such discharge are to be seen in the long wooden sewer under the wharf of the Cunard steamship line at the foot of Clarkson street, and also in the wrought-iron sewer built beneath the pier and discharging into deep water at the Houston Street ferry, East river.

The success of these newer methods has certainly been sufficient to justify a more rapid extension of its benefits to many parts of the system which are still suffering from the defects of the old method.

*Ventilation.*—The ventilation of the sewers of New York is almost invariably extremely defective, the perforated manhole covers used in some cases affording quite inadequate means of relief, and there being no prospect of suitable ventilation until the health authorities of the city shall require (they now prohibit) that every house-drain and soil-pipe shall furnish its quota of free ventilation to the sewer into which it discharges.

*General observation.*—While the sewerage of New York, especially the newer work, is in far better condition than its reputation would lead one to suppose, it is still very far from being perfect or satisfactory.

*The extent of existing works.*—The extent of the sewerage of New York at the present time (1880) and its rate of increase are indicated in the accompanying table:

Periods.	NUMBER OF MILES OF—			Number of receiving-basins.
	Sewers.	Under-ground or land drains.	Culverts.	
Total .....	341.34	13.91	18.08	4,540
Estimated as constructed prior to the organization of the Croton Aqueduct department in the year 1849.....	69.36	.....	3.67	909
Estimated as constructed by the Croton Aqueduct department from the year 1849 to the passage of the sewerage act in 1865 .....	125.16	.....	7.00	1,871
Constructed by the Croton Aqueduct department from the year 1865 to the organization of the department of public works in 1870 .....	57.17	0.94	2.01	632
Constructed by the department of public works from the year 1870 to the passage of the charter of 1873 .....	36.98	3.89	1.95	482
Constructed by the department of public works from 1873 to and including the year 1878.....	48.78	9.08	3.11	635
Constructed by the department of public works during the year 1879.....	2.25	.....	0.16	35
Constructed by the department of public works during the six months ending June 30, 1880.....	1.64	.....	0.09	16

Making the total length of sewers, culverts, and subsoil drains on Manhattan island, July 1, 1880, 1,971,197 linear feet, or 373.33 miles.

The foregoing table does not include many miles of sewers and other works rebuilt to supply the place of those destroyed or fallen to pieces; nor does it include large amounts expended in repairing and rebuilding basins and manholes, but is intended to show only the growth of the sewerage system.

#### DISPOSAL OF SEWAGE.

The method of disposal of the sewage of New York is to conduct it by the most convenient course to the bulkhead of the nearest river, and leave the rest to the operations of nature. Most of the piers and wharves along the shore are of a temporary nature, built on piles driven in the soft bottom of the river. As these piles settle or decay, the structures above them are blocked up with timber until the blocking itself is sometimes submerged by the tides. Some of the older piers, especially near the shore, are made of cribs of timber filled with stones. All this, together with the hulks of boats lying alongside, has a tendency to diminish the flow of water so much that there is little current to be noticed along the bulkhead. Sewers discharging into this slack-water pollute the whole of it. Light fecal matter rises to the surface and floats away, while the solid heavy matter settles to the bottom, carrying much organic matter with it. This organic matter by its decay generates gases which saturate the water and the atmosphere above, and the slips are in time filled with this fine soft mud. This mud is now usually removed by dredging, but in former years it has accumulated, and the streets and wharves have been extended farther out into the stream, until in some places two or three streets and blocks parallel with the river have been built upon this kind of foundation.

*The condition of the water-front.*—The condition of the water-front has been carefully noted during the present summer (1880). There are no less than 80 outlet-sewers discharging their contents into the river below Fourteenth street. The area of land drained by each of them is from 1 acre to 360 acres. The combined territory amounts to nearly 4 square miles, and is inhabited by a population not less than 541,726. The pernicious effect of discharging so great a body of sewage into the docks and slips can not well be exaggerated. The outlet of a sewer may be seen at any tide by the grayish-white appearance which its waters assume when brought into contact with the salt water of the river. These foul discharges may be traced out into the sluggish waters of the slips until they mingle with each other and impart their impurities to the entire shoal waters of the docks. At low tide all the wood-work of the piers and bulkhead adjacent to the sewer outlets is seen to be covered with a white, stringy slime, and the

shallow waters are filled with bubbles of gas which rise to its surface until broken up, together with the scum, and scattered by some passing boat. When heavy rains send great discharges of water through the sewers, thousands of tons of solid matter is swept out, which quickly settles to the bottom, where it accumulates and decomposes, adding to the impurity of the water and encroaching upon the depth of the docks, until finally it has to be removed by dredging.

*The old sewer.*—At Broad street the old sewer discharges the drainage from its 38 acres directly under the large wharf, which is covered with thousands of barrels of flour, and into the water of the slip, where hundreds of canal-boats are lying, the population of which would form a small city. Examinations made along the North River shore exhibit a condition almost precisely the same as just described. The population along the west side is not so dense, but its shore-line is less and its drainage area greater than at corresponding places on the east side, and the pollution of its waters is, if any thing, worse than on the east side. There is no spot in New York below Central park which is not within one mile in a direct line of one of its rivers, and hence every one of its citizens is at times exposed to the pernicious influence of a polluted stream within that distance of his residence, while every office, place of business, or storehouse below the city hall is within half a mile of one or both of the rivers. Although the population of the lower wards (below city hall) is not great, yet its transient population is beyond all means of careful estimate, composed of people from all parts of the world, coming here for trade and other purposes. Besides this, hundreds of thousands come here daily to attend to business, and retire to their homes at night, while the shipping in the harbor and along the shore contains a large population, exceeding that of some cities. The ultimate disposal of the solid matter contained in the sewage of New York is difficult to trace. Much of it after decomposition or maceration is undoubtedly carried out at Sandy Hook, the outflow of that channel being, as explained in the paper on the tides of New York harbor, much greater than the inflow. Much of the sewage is deposited beneath the shallower portions of the adjacent waters, and largely in that great feeding basin of the oyster, Prince's bay.

*Tabular statement of the outlets, size, and the approximate area drained, of the sewers in the city, exclusive of the 23d and 24th wards.*

Place of outlet.	Size of sewer.	Drainage area.	When built.	Place of outlet.	Size of sewer.	Drainage area.	When built.	Place of outlet.	Size of sewer.	Drainage area.	When built.
<i>West side.</i>		<i>Acres.</i>		<i>West side—Continued.</i>		<i>Acres.</i>		<i>West side—Continued.</i>		<i>Acres.</i>	
West 155th street (a) .....	Pipe .....			Jano street .....	4' square .....	32.05		Canal street (g) .....		362.09	
West 152d street .....	3' diameter .....			West 12th street .....	4' × 2' 8" .....	21.60	1872	Watts street .....		2.17	
West 142d street .....	4' diameter .....			Bethmen street .....	4' × 2' 8" .....	6.06		Desbrosses street .....		5.20	
West 138th street .....	15" pipe .....			Bank street .....	4' × 2' 8" .....	18.20		Vestry street .....		10.30	
Manhattan street (b) .....	5' 0" × 7' .....		1874	Duane street .....		20.75		Hubert street .....		10.39	
West 108th street .....	4' diameter .....		1875	Warren street .....		3.46		Beach street .....		3.46	
West 96th street .....	6' 9" × 6' .....		1873	Murray street .....		18.19		North Moore street .....		5.20	
West 79th street .....	5' 7" × 5' .....		1873	Park place .....		2.60		Franklin street .....		5.20	
West 70th street (a) .....	3' diameter .....			Barclay street .....		27.72		Harrison street .....		2.60	
West 66th street .....	4' diameter .....		1868	Vesey street .....		18.19		Jay street .....		20.85	
West 59th street .....	4' × 2' 8" .....		1876	Fulton street .....		2.16					
West 56th street .....	3' diameter .....		1873	Dey street .....		3.03		<i>East side.</i>			
West 55th street .....	3' diameter .....		1876	Cortlandt street .....		10.36		East 147th street (h) .....	5' 0" diam. ....		
West 51st street .....	4' × 2' 8" .....		1867	Liberty street .....		6.06		East 136th street and			
West 49th street .....	4' × 2' 8" .....		1859	Cedar street .....		6.06		Fifth avenue .....	6' × 4' 6" .....		
West 48th street .....	4' × 2' 8" .....		1871	Albany street .....		2.60		East 135th street and			
West 47th street .....	4' × 2' 8" .....		1863	Carlisle street .....		0.86		Fourth avenue .....	3' 7" × 2' 4" .....		1853
West 46th street .....	4' × 3' .....		1867	Rector street .....		19.93		Third avenue .....	4' × 2' 8" .....		1861
West 45th street .....	4' × 2' 8" .....		1879	Morris street .....		5.20		Second avenue (a) .....			
West 44th street .....	4' × 2' 8" .....		1879	Battery place .....		8.66		East 125th street .....	4' × 2' 8" .....		1861
West 43d street .....	4' × 2' 8" .....		1863	West 11th street (f) .....		10.39		East 124th street (a) .....			1876
West 42d street (b) .....	8' 0" diam .....		1850	Perry street .....		13.43		East 122d street .....			
West 40th street .....	5' diameter .....		1878	Charles street .....		7.36		East 120th street .....			
West 39th street .....	18" pipe .....		1866	West 10th street .....		12.13		East 119th street (a) .....	15" pipe .....		1869
West 38th street .....	15" pipe .....		1867	Christopher street .....		9.10		East 118th street .....			1853
West 37th street .....	4' × 2' 8" .....		1866	Barrow street .....		2.60		East 117th street (a) .....	12" pipe .....		1867
West 36th street (a) .....	3' 6" × 2' 4" .....		1876	Morton street .....		2.17		East 110th street (b) .....	8' × 12' .....		1871
West 34th street (c) .....	4' × 2' 8" .....		1859	Leroy street .....		19.06		East 106th street (b) .....	5' 6" × 7' .....		1875
West 17th street (b) .....	5' 3" × 10' .....		1871	Clarkson street (e) .....		323.98		East 89th street .....	5' diameter .....		1871
West 14th street .....	5' 0" diam .....		1851	Houston street .....		15.73		East 86th street .....	4' × 2' 8" .....		1854
Little street (d) .....				King street .....		12.99		East 79th street .....	5' diameter .....		
Gansevoort street .....	4' × 2' 8" .....	26.00		Charlton street .....		26.85		East 74th street .....	6' diameter .....		1863
Horatio street (e) .....		10.30		Spring street .....		2.60		East 62d street .....	3' 0" diam .....		1869
								East 61st street (a) .....	4' × 2' 8" .....		1863

a Short.

b Trunk-sewer.

c Sewers between 34th and 17th streets have been intercepted by trunk-sewer in Eleventh avenue.

d Small.

e Old.

f Sewers from West 11th street to Canal street are to be intercepted by trunk-sewer in West street, discharging at foot of Clarkson street.

g Old trunk-sewer. Sewers from Canal street to Jay street to be intercepted by trunk-sewer in West street and discharged at foot of Canal street.

h To be taken to 135th street.

Tabular statement of the outlets, size, and the approximate area drained, of the sewers in the city, exclusive of the 23d and 24th wards—Continued.

Place of outlet.	Size of sewer.	Drainage area.	When built.	Place of outlet.	Size of sewer.	Drainage area.	When built.	Place of outlet.	Size of sewer.	Drainage area.	When built.
<i>East side—Continued.</i>		<i>Acres.</i>		<i>East side—Continued.</i>		<i>Acres.</i>		<i>East side—Continued.</i>		<i>Acres.</i>	
East 57th street (a) .....	18" pipe.....	1807		East 16th street (a) .....	3' 6" diam.	13.40	1858	Gouverneur street .....		25.10	
East 54th street (a) .....	4' x 2' 8" .....	1859		East 14th street (e) .....	6' x 7' each	271.10		Jefferson street (b) .....		85.80	
East 53d street (a) .....	3' 0" x 2' 4" .....	1875		East 11th street (f) .....	6' x 7' .....	6.90		Rutgers street .....		25.10	
East 49th street (b) .....	9' x 8' 6" .....	1854		East 8th street (a) .....	6' x 7' .....	3.50		Pike street .....		15.60	
East 48th street (a) .....	4' x 2' 8" .....	1863		East 7th street (a) .....	6' x 7' .....	5.20		Market street .....		22.50	
East 47th street (a) .....	4' x 2' 8" .....	1861		East 6th street (a) .....	6' x 7' .....	3.50		Catherine street .....		12.10	
East 46th street (a) .....	12" pipe .....	1869		East 5th street (a) .....	6' x 7' .....	11.70		Oliver street .....		20.80	
East 45th street (a) .....	4' x 2' 8" .....	1861		East 4th street (a) .....	6' x 7' .....	5.60		James slip .....		20.80	
East 44th street (a) .....	15" pipe .....	1870		East 3d street (g) .....	4' x 6' .....	34.60		Roosevelt street .....		84.90	
East 43d street (a) .....	3' 6" x 2' 4" .....	1880		Houston street (h) .....	4' diameter	84.90	1880	Dover street .....		1.30	
East 42d street (b) .....	6' diameter .....	1879		Stanton street .....	4' 6" diam.	52.00		Peck slip .....		40.30	
East 33d street (b) .....	8' x 5' 6" .....	1867		Rivington street .....	4' 6" diam.	45.00		Fulton street .....		22.60	
East 28th street .....	4' diameter .....	1848		Delancy street .....	4' diameter	66.00		Burling slip .....		19.10	
East 23d street (b) .....	5' x 4' .....			Broome street .....	4' x 2' 5" .....	48.50		Maiden lane .....		10.10	
East 22d street (c) .....	4' 6" x 3' 4" .....			Grand street .....		11.30		Wall street .....		9.10	
East 21st street (a) .....				Cherry street .....		4.30		Old slip .....		12.10	
East 18th street (d) .....	6' x 8' .....			Corlears street .....		17.30		Broad street .....		38.10	
East 17th street (a) .....	4' x 2' 8" .....	11.30	1867	Jackson street .....		9.50		Whitehall street .....		13.80	

a Short.

b Trunk-sewer.

c To be taken to 23d street.

d Ellipse on its side.

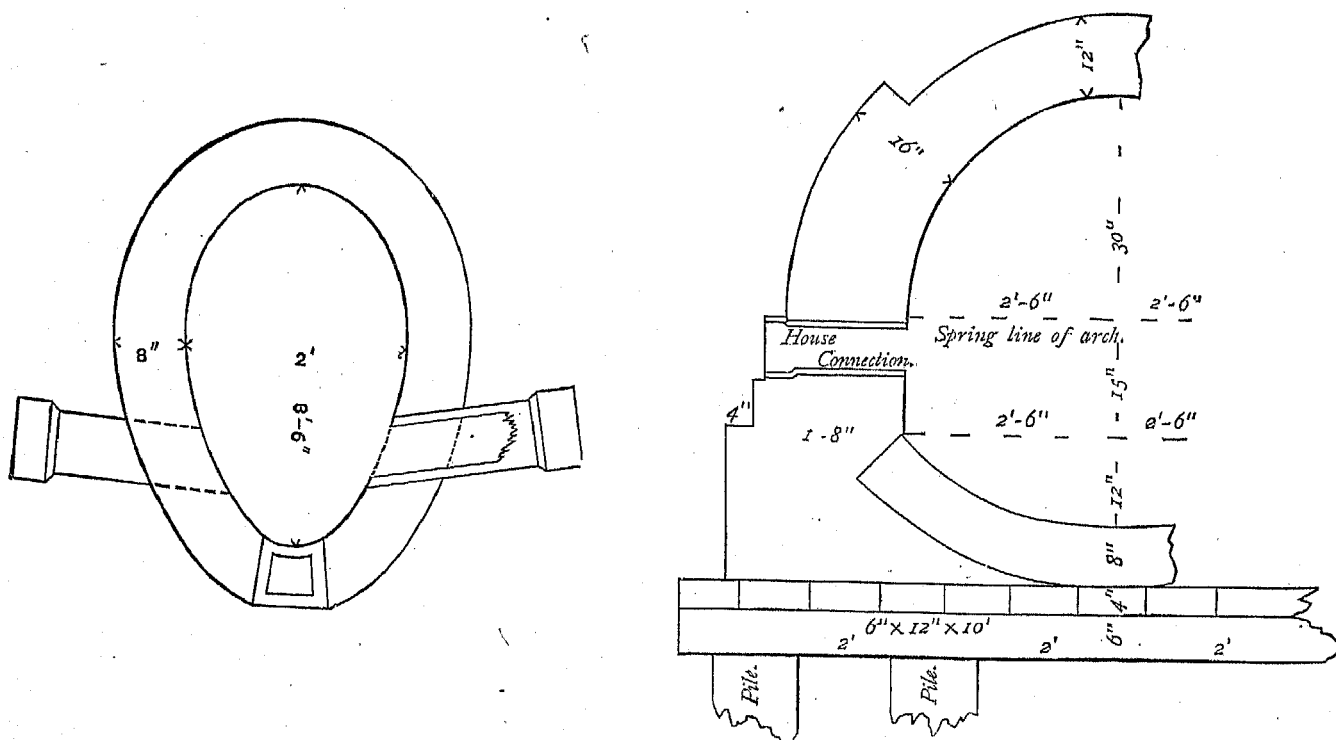
e Old double sewer.

f Short; east of avenue D.

g Box.

h Galvanized iron.

**House-connections.**—The method of connecting house-drainage with the sewers almost universally practiced in New York is by vitrified clay pipes of 6 inches interior diameter. Any plumber having a license may secure from the bureau of sewers a "permit" to open the sewer and make connection with it. Sewers are usually from 12 to 15 feet below the pavement, and this secures sufficient fall to insure good drainage if the house-connections are properly made and laid with a uniform fall. All sewers built at the present time have pipes inserted at frequent intervals, usually about 15 feet, for subsequent connections to be made without disturbing the masonry of the sewer. These are placed as in the sketch shown below, giving cross-section of sewer built in One hundred and fifth street, between Fourth and Fifth avenues, the specification for which is dated March 25, 1880.



The above sketch shows the position of house-connections at intervals of 15 feet in the intercepting sewer in West street, now building near the foot of Clarkson street. Where it becomes necessary to connect with sewers where no provision has been made for that purpose, it is required always to enter below the spring-line of the arch

forming the top of the sewer. Clay pipes used for house-sewer connections answer an excellent purpose when properly laid, as their hard, smooth interior surface affords but little obstruction to the flow of the contents. New York, like every city built upon ground naturally so uneven, presents every variety of conditions to be overcome in house-drainage. Perhaps the most unfavorable is where streets and lots have been graded up many feet above the natural surface, with large stones and fragments of rock loosely thrown in. When these great pieces of rock have to be removed to make room for house-drains, the plumber observes that the house-drainage may be allowed to flow into the large crevices between the rocks and be undiscovered for a long time, perhaps never in his business lifetime, and the thought is father to the act, and unless watched with unusual vigilance the pipes do not extend to the sewer. Even when pipe is carefully laid and faithfully connected with the sewer, the unequal settlement and pressure of sharp stones or rocks often crush or break the pipe until all the water leaks out before reaching the sewer. Instances of this kind have been referred to in this report. Many cases of broken and defective house-connections have been discovered and repaired, and without doubt many more exist which have not yet been discovered.

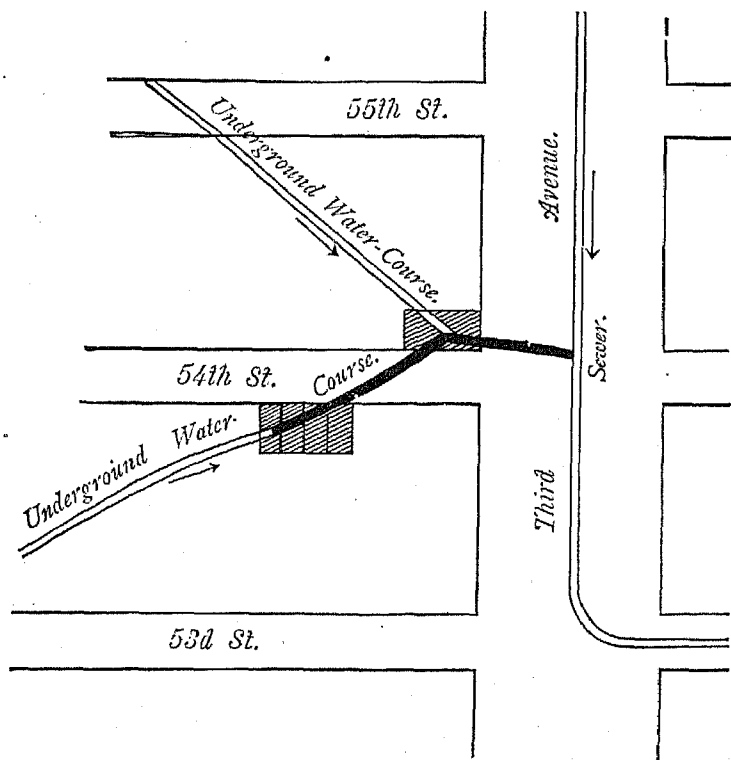
Instances where house-drains have been discovered to discharge into the ground before reaching the sewer may be mentioned in Fifty-sixth and Fifty-seventh streets, near Sixth avenue; in Seventy-seventh street, between First and Second avenues; and in Sixtieth street, between Fourth and Madison avenues, where six houses discharged their drainage into the ground until the cellars of houses on the opposite side of the street were flooded, which led to the detection of the defective work.

Unprincipled plumbers and builders have sometimes drained houses into underground water-courses instead of into the sewers. As the water-courses run beneath private property, it is very convenient and saves expense to turn the house-drainage into them. But the masonry of the underground land-drains is open and loose, and if the streams running through them become polluted, they become an injury to all the property through which they flow. It is so difficult to find out the guilty parties and to ascertain from what houses the drainage comes, that without doubt many cases still exist. A single instance is shown in the diagram, to illustrate the operation of the pernicious practice of draining into water-courses.

Houses on the south side of Fifty-fifth street were found to have their drainage turned into the land-drain which subsequently passed beneath the house on the opposite side of the street. These drains are built of loose masonry and are intended to carry only clear water. The drainage of these houses has since been turned into the street-sewer, where it properly belongs.

A large proportion of the houses of New York, especially above Fourteenth street, are built upon a foundation of solid rock. It would seem at first thought as if such houses would naturally require no drainage from the cellar, but a little reflection will bring to mind that water percolating through the soil until it meets the bed-rock must then follow the rock surface until some outlet is found to the river or through crevices and seams in the rock. Cellar-walls built on the surface of bed-rock usually admit water along its surface, nor is this evil less when cellars and basements are blasted out of the ledge for them. Not only will water from the surface work its way through the walls of the foundation, but the numerous seams in the rock admit water enough to render cellars damp, if not actually wet.

The situation is still further complicated where cellars are blasted out of the ledge, and street-sewers are laid in a trench opened in the rock for that purpose, for then the sewer is accessible from the cellar only by blasting through the intervening space of solid ledge from 20 to 50 or more feet thick. In such cases the drainage from the upper story is sometimes conducted to the sewer over the surface of the rock, and the basements of adjacent houses are drained to one common outlet. This is most likely to be found in a block where several houses are built by one person. In order to save the expense of making a separate connection through the rock for each house, a drain will be laid beneath the basement floors to receive the drainage of all and conduct it to a sewer by a single outlet. The increased length of house-drains, traversing so many lots before reaching the sewer, necessitates





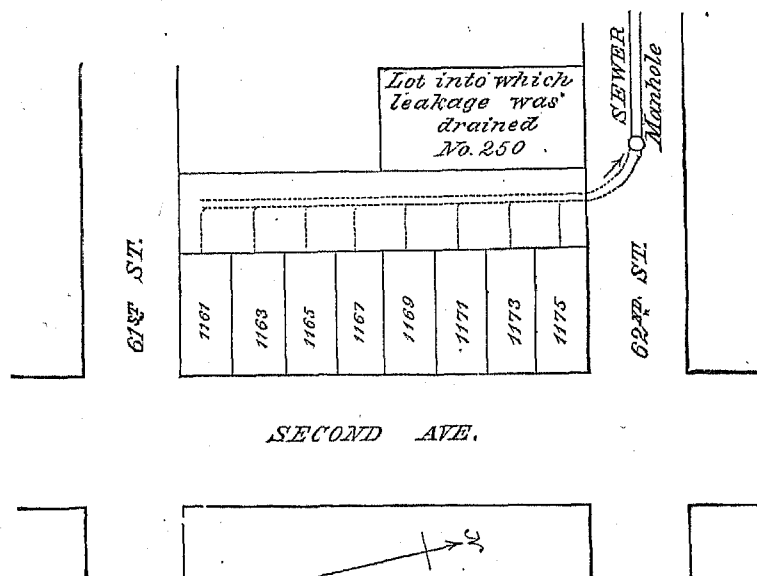
laying them on very flat grades. The flow of water is hence sluggish, and it is impossible to build them tight enough to prevent leakage of water and gas. So long as the houses remain the property of one person, repairs can be made when necessary; but when the houses are sold and become the property of several different persons, the maintenance and repairs of such drains become still further complicated, as the drainage of one house may pass beneath the floors of several different owners, while on the other hand the drain beneath one's house is required to carry not only its own drainage, but that of several neighbors over whom one can exercise no influence or control. One or two instances will be sufficient to illustrate this pernicious system of house-drainage. On the south side of Thirty-eighth street, between Seventh and Eighth avenues, a row of brownstone-front houses is drained by a brick drain beneath the cellar floor. In June last, (1880) this drain broke and its contents were poured into the cellar of one of these houses. If this was not the cause of the prevalence of diphtheria in that house, it evidently furnished an atmosphere favorable for the development of that disease.

Without doubt the worst recorded instance of draining several houses by a single connection was discovered not long since by the authorities of the health department. A block of English-basement houses, having no cellar, but built on the solid ledge, was drained into an open trench about 2 feet wide and 1 foot deep, blasted out of the solid rock and extending under all the houses. This trench had no covering whatever, but formed simply an open sewer, with nothing between it and the atmosphere of the dwelling but the boards of the basement floor. Charity forbids us to consider this as any thing else than a rare exception; but practically it was not much, if any, more detrimental to health than the faulty, leaky, and defective brick and pipe drains to be found beneath the floors of so many dwellings in this city.

The method of connecting several houses by a single sewer-connection is not alone practiced in buildings built upon rock foundation, though this affords a good pretext for its practice. In some streets there is no sewer, but this is of rare occurrence. An instance or two will illustrate this evil:

In First avenue from Twenty-first to Twenty-fifth streets there is no sewer, and houses are drained laterally to the streets on either side by brick or pipe drains having but little fall, and passing through adjacent lots, or beneath

other buildings belonging to different owners, so that the last one, usually in the corner house, is master of the situation, and can cut off all above him, while an obstruction in any lot or house causes trouble in all those behind. In Second avenue from Sixty-first to Sixty-second streets there is no public sewer. The drainage of eight houses on the west side is by a single drain in the rear, leading to the sewer in East Sixty-second street. This drain not long since was in a defective condition, and its sewage found its way into a neighboring cellar, and was then brought to the attention of the board of health, which caused the drain to be repaired, and also on August 17, 1880, reported it to the department of public works recommending a sewer in Second avenue. The diagram illustrating this block is copied from a diagram in the office of the department of public health.



Instances similar to the above are common, and are not confined to those streets in which there is no public sewer, but are frequently employed to save the expense of making separate connections for each house, whether in rock or in earth. An instance in Twenty-third and Twenty-fourth streets between Ninth and Tenth avenues will serve as an illustration. The private sewers in the rear of the houses are insufficient, and the board of health is compelling separate connections to be made for each house with the public sewers in Twenty-third and Twenty-fourth streets.

The practice of draining beneath the basement floors is not confined to cases of the kind above referred to, where drainage is taken from one house to another, but is even more frequently practiced in the single houses, especially when kitchens, laundries, and closets are in the rear and must be connected with street sewers in front. This great evil is unavoidable in a city laid out as New York is, without the benefit of alleys or back streets; for there is no access from rear lots or buildings to the streets except through or under the front buildings.

It is by no means unusual to find a brick or clay-pipe drain buried in the ground beneath the basement floor taking the drainage of the whole house—the water from the roof, the surface-water from the back-yards and areas, and, in many instances, even the overflow from privies; and for this evil there appears to be no remedy. The only safety consists in the use of heavy iron pipes calked with lead. Wherever it is possible to do so, these iron drain-pipes should be attached to the side walls of the house, above the basement or cellar surface, in order to be in plain

sight, and to avoid their destruction by oxidation, which would be sure to take place if they were buried in the ground. This practice is now coming into common use, and is in many instances ordered by the board of health to replace defective brick and clay-pipe drains.

An instance in First avenue will illustrate the practice of draining beneath the basement floor. Here a five-story brick building has a brick drain beneath it, taking the overflow from a privy-vault in the back yard. The cellar is but 4 feet deep, and has no outer communication except by a trap-door in the floor of the grocery store in the basement. An inspection recently made showed the ground to be saturated with moisture, and the persons occupying the basement complained that at times there was standing water in the cellar covering the whole surface. Drains in such situations are evidently inaccessible, and a leak may remain for many days, or even months, before its existence is discovered. Even when discovered it is very difficult to remedy, and the soil-pollution produces evil effects for many years afterward. At a house in West Thirty-ninth street, by an inspection made with Dr. Lockwood, August 27, 1880, the sewer-connection was found to be defective and the cellar flooded with water.

*House-plumbing.*—The notes made concerning the plumbing-work of New York houses, while interesting, are too copious for such reduction as the restricted space of this report would require. It is only possible to present parts of a report of an inspection made in the autumn of 1880, by Robert A. Johnston, esq., civil engineer, assistant engineer of the health department:

In accordance with your directions, I have made a personal examination of a number of private dwelling-houses which were either in course of construction or just finished, and which were situated in different parts of the city.

I have examined in all one hundred and fifty-one (151) private dwelling-houses in twenty-one (21) different localities. \* \* \*

The plumbing-work in the majority of the houses examined is hidden in the walls of the building, and in case of an existing nuisance it would be a very difficult matter to make a practical examination of the pipes from which a nuisance might emanate. I also find that in most cases it is a common practice with plumbers to extend the soil-pipe from the water-closet on the top floor only half size \* \* \* which is in all cases totally inadequate for the purpose. In all the houses examined there was the proper number of traps, but in most cases very small ones, and where the soil- and waste-pipes were not ventilated these small traps were entirely useless. \* \* \* In some cases there are two, three, and sometimes six or eight houses with a single connection with the street-sewer, which is the worst possible condition for house-sewers, as all houses should in all cases have a separate street-sewer connection. \* \* \* In the majority of cases the sewers are under the cellar floor, and not along the side wall of the cellar as they should be. I find from experience that the greatest trouble with sewers is from a stoppage up of the pipe and its consequent breaking, every such case in my experience being with sewers buried under the ground, the trouble being due to a lack of descent to the street-sewer. \* \* \* The sewer-pipes are mostly of earthenware. This, I think, is to be regretted, as when they are buried under the ground (as most sewer-pipes are) a great deal of trouble is experienced from the breakage of these pipes which would not occur with iron pipes. The builder and owner of the twelve (12) houses between 106th and 107th streets is at present building them and a number of other houses without any ventilation of the pipes, and with very small traps, rendering the inmates of such houses liable to the attacks of sewer-gas at all times, the traps being no safeguards whatever in case of non-ventilation, from the fact of the siphoning of the traps at each discharge through the waste-pipes, and the consequent opening of communication with the street-sewer. Such are the conditions which will surely prevail in the above-mentioned houses, and also in a large majority of the private houses of New York city where the above-mentioned sanitary arrangements are in force.

#### CEMETERIES.

Though there are 23 cemeteries, church-yards, and burial-grounds within the corporate limits of New York, only 7 of them are now used for interments, the final disposition of the city dead being largely in cemeteries situated in the adjoining counties. The land on Manhattan island has become so valuable for building-purposes that these burial-grounds are gradually being absorbed by the growing city, the remains of those interred in them being removed to cemeteries at a distance.

The following-named cemeteries, in which interments are still made, are in the city:

*City Cemetery*, undenominational, located on Hart's island, in the East river, is the pauper burial-ground.

*Marble Cemetery*, undenominational, situated in the 17th ward.

*Randall's Island Cemetery*, undenominational, on Randall's island, East river (12th ward).

*Trinity Cemetery*, undenominational, between One hundred and fifty-third and One hundred and fifty-fifth streets on Tenth avenue.

*Woodlawn Cemetery*, area 379 acres, in the annexed district, 24th ward.

*West Farms Cemetery*, also in the 24th ward.

*Ward's Island Cemetery*, on Ward's island, East river, in the 12th ward.

The following-named burial-grounds, church-yards, etc., are in the city proper, but as they are not included in the list of cemeteries issued by the board of health, it is supposed that burials are either no longer permitted in them, or that they are made under certain restrictions: Jewish, on the New Bowery; Saint John's Episcopal, on Hudson street; Jewish, Eighty-sixth and Eighty-ninth streets, Third and Fourth avenues; Saint Michael's Episcopal, One hundred and fourth street, between Ninth and Tenth avenues; Naegle's (Jewish) cemetery, on Eleventh street; Methodist, on Nineteenth street; Jewish, on Twenty-first street; Methodist, on First street; Roman Catholic burying-grounds, location not given; Jewish, Thirty-second street, between Sixth and Seventh avenues, and another on Thirty-sixth street, between Eighth and Ninth avenues; Catholic, on Saint Ann's avenue; Dutch Reform and Jewish, on Sixth avenue.

The following is the list of cemeteries, outside the city, largely used by the citizens of New York for the burial of their dead:

Name of cemetery.	Denomination.	Location.	Name of cemetery.	Denomination.	Location.
Bayside .....	Jewish .....	Bayside, L. I., N. Y.	New York Bay .....	Undenominational .....	Near Greenville, N. J.
Calvary .....	Roman Catholic .....	Newton, L. I., N. Y.	Cemetery .....	.....	Newark, N. J.
Cypress Hill .....	Undenominational .....	Ridgewood, L. I., N. Y.	Saint Peter's .....	Roman Catholic .....	Jersey City, N. J.
Evergreen .....	Undenominational .....	Ridgewood, L. I., N. Y.	Saint Raymond's .....	Roman Catholic .....	Westchester, N. Y.
Evergreen .....	Undenominational .....	Elizabeth, N. J.	Saint Michael's .....	Episcopal .....	Astoria, L. I., N. Y.
Flushing .....	Undenominational .....	Flushing, L. I., N. Y.	Cemeteries .....	.....	Staten Island, N. Y.
Greenwood .....	Undenominational .....	Brooklyn, L. I., N. Y.	Salem Fields .....	Jewish .....	New Lots, L. I., N. Y.
Hoboken (Jews' Own, 64 feet square) .....	Undenominational .....	Hoboken, N. J.	Union .....	Methodist Protestant .....	Brooklyn, L. I., N. Y.
Hudson County Company .....	Roman Catholic .....	Jersey City, N. J.	Union Fields .....	Jewish .....	Brooklyn, L. I., N. Y.
Holy Cross .....	Roman Catholic .....	Flatbush, L. I., N. Y.	Washington .....	Undenominational .....	Gravesend, L. I., N. Y.
Jersey City .....	.....	Jersey City, N. J.	Weehawken, N. J. .....	.....	Weehawken, N. J.
Lutheran .....	Undenominational .....	Mid Village, L. I., N. Y.	Yonkers .....	Undenominational .....	Yonkers, N. Y.
Machpelah .....	Jewish .....	New Lots, L. I., N. Y.	Mount Pleasant .....	Undenominational .....	Newark, N. J.
Machpelah .....	Undenominational .....	New Durham, N. J.	Linden Hill .....	.....	Near Brooklyn, L. I., N. Y.
Methodist Episcopal .....	Methodist Episcopal .....	East Williamsburg, L. I., N. Y.	Maple Grove .....	.....	Jamaica, L. I., N. Y.

No record could be obtained of the number of interments in all of the cemeteries, etc., given above, but from the reports of the board of health the number of burials from New York city was 26,194 in 1877, 27,005 in 1878, 28,367 in 1879, and 31,866 in 1880.

Owing to the fact that a large majority of the interments are made outside the city, the burials are governed more or less by rules and regulations that are in force in the municipalities where the cemeteries may be located. The board of health of New York, however, allows no body to be carried from the city except on a permit granted by the board. Interments within the corporate limits are made only on burial permits granted by the board, and all graves must be 6 feet deep below the surface and 4 feet below the grade of any closely adjacent street.

#### MARKETS.

With a more bountiful supply of provisions, both of necessity and of luxury, than can be had in any city of the world (a remark especially true of its fish, which has developed into a separate trade, under control of the "Fishmongers' Corporation"), there is no capital city where the market accommodations, both for seller and for buyer, are so badly managed as here. In 1874 the cash sales of food in the several markets aggregated \$130,000,000, and this must be largely increased at the present time, for it is estimated that in addition to the regular supplies needed for over 1,200,000 persons, at least 400,000 visitors lunch and dine in New York every working-day.

The following description of the ten markets belonging to the city is taken from the *Report of the Department of Public Works* for 1879:

Washington market occupies the block bounded by Washington, West, Fulton, and Vesey streets, and covers an area of 42,875 square feet. "It is a mere jumble of unsightly, dilapidated one-story frame buildings."

West Washington market lies between West street, the North river, Dey Street pier, and Vesey Street pier, and covers 558,000 square feet of ground, including the streets and avenues by which it is traversed. The buildings are two-story wooden structures. The streets and avenues are paved with stone blocks.

Fulton market is a one-story wooden structure (excepting three small two-story brick buildings fronting respectively on Fulton, Front, and Beekman streets), and occupies the block bounded by Beekman, Fulton, South, and Front streets, with an area of 33,000 square feet. "It is a complete piece of patchwork, continually needing repairs."

Catherine market covers 7,700 feet of land on Catherine street, extending from South street to Cherry street, and consists of two one-story buildings, having oval metal roofs supported by brick piers.

Union market is a plain, substantial three-story brick building between Houston, Second, and Sheriff streets and avenue I, and has a superficial area of 7,175 square feet. The second story is used as a police station.

Essex market is bounded by Grand, Essex, and Ludlow streets and Essex Market place, and covers 14,550 square feet. It is a three-story brick building, the second and third floors being used as an armory.

Tompkins market, between Sixth and Seventh streets, Third avenue, and Hall place, covers an area of 18,000 square feet. It is a three-story iron building, with a new truss and slate roof built in 1874, and the second and third floors are used for an armory. The whole building is in complete order, and is in all respects the best market building owned by the city.

Jefferson market, with an area of 12,000 square feet, is at the junction of Sixth and Greenwich avenues, with a frontage of 125 feet on each. A portion of it is a two-story brick building, and the remainder a one-story wooden structure, with a steep roof, supported on brick piers, and the whole is unsightly and dilapidated.

Clinton market is situated between Spring, Canal, Washington, and West streets, and covers about 22,700 square feet. With the exception of one brick building, 35 by 45 feet, fronting on Washington street, this market is only a collection of old one-story wooden buildings.

Center market is a two-story brick building covering 18,000 square feet, bounded by Broome, Grand, and Center streets and Center Market place. The southerly half of the structure is comparatively new and in good condition, while the northerly half is old and dilapidated.

From 1874 to 1878, inclusive, there has been a revenue of \$1,768,757 54 collected from the occupants of these market buildings, an average of \$353,751 51 per annum, and the expenditures for repairs during the same period amounted to \$57,554.

#### SANITARY AUTHORITY—BOARD OF HEALTH.

The sanitary care of the city of New York is intrusted to the health department, or board of health, which is composed of four members, viz: The president of the board of police, the health officer of the port, and two commissioners of health, one of whom shall have been a practicing physician for not less than five years; the other commissioner, who is the president of the board, need not be a physician. The first two are members *ex officio*, while the commissioners are appointed by the mayor, subject to the approval of the board of aldermen, and hold office for six years. There are also two bureaus in the department—one a sanitary bureau, at the head of which is a sanitary physician, who must have been during ten years a practicing physician, while the other bureau is merely one of records. There is no practical limit fixed by law to the discretion of the board of health either over the revenues or over the property of the city. In times of public peril a great portion of the sovereignty of the state is committed to this board. It can, without any restraint but its own discretion, employ lawyers, agents, policemen, and public money wherever it declares a sanitary peril to be in sight, and it may remove, or cause to be removed or abated, any thing "dangerous to life or detrimental to health".

The annual expenses of the board, when there is no declared epidemic, exclusive of special appropriations for the erection of hospitals, etc., is about \$300,000, for salaries, law expenses, abating nuisances, disinfection, removal of night-soil, etc., hospital for care of contagious diseases, supplies and transportation, tenement-house fund, and night medical-service fund. During an epidemic the expenses may be increased to any amount deemed necessary.

The board is empowered to enact a sanitary code, containing provisions for the security of life and health in the city, and distributing and defining the powers and duties of its subordinates. Any violation of this code is treated as a misdemeanor, and the offender is liable to a fine of \$50, to be recovered in a civil action in the name of the mayor, aldermen, and commonalty of the city of New York.

#### SANITARY FORCE.

The sanitary superintendent, salary \$4,800 per annum, is the chief executive officer of the board, with full power to execute all its orders, and to see that all sanitary rules and regulations are enforced. He is assisted by 1 assistant sanitary superintendent, 15 sanitary inspectors, 2 assistant sanitary inspectors, 1 inspector of vaccination, and 15 sanitary inspectors for care of contagious diseases, who are all physicians, and 4 milk inspectors, 2 meat inspectors, and 9 sanitary engineers for the inspection of plumbing, who are not physicians. In addition to the above, 30 policemen are detailed for duty under the board, when their services are required. The sanitary superintendent and his assistants have sufficient police powers to enter and inspect all premises, and forcibly to remove all persons sick with contagious diseases.

The board meets once a week regularly, or as often as necessary, and transacts its business as follows: (1) Reading of minutes; (2) report of attorney; (3) reports of standing committees; (4) reports of special committees; (5) communications from chiefs of bureaus; (6) communications from the board of police; (7) communications from all other sources; (8) resolutions and orders; (9) unfinished business; and (10) new business. The office hours are from 9 a. m. to 4 p. m., and the chief officer of each bureau, the sanitary inspectors, and assistant inspectors are considered as being always on duty.

#### NUISANCES, ETC.

Tenement-houses, slaughter-houses, and other places in any part of the city liable to be in an unsanitary condition are inspected regularly, while all nuisances reported or complained of are specially inspected. When a nuisance is found to exist notice is at once sent to the owner or lessee of the premises, stating what must be done to abate the same, and steps are taken to see that the instructions given are complied with. In the case of defective house-drainage, privy-vaults, cesspools, etc., upon the sworn report of an inspector, the proper notice or order is issued and sent by mail, stating wherein the ordinances are violated. If the necessary correction is not made, a suit for penalty is begun. In cases requiring immediate action a warrant for arrest is obtained if the notice or order is not complied with.

When street-sewers are found defective the department of public works is officially notified and requested to remove or correct the same. Uncleanly streets are reported to the department of street-cleaning.

## GARBAGE, ETC.

Though the removal of garbage is in charge of the street-cleaning department, the sanitary code provides for the proper conservation of the same, and the sanitary inspector is required to see that the garbage is regularly removed so that no nuisance occurs.<sup>(a)</sup> All excrement is removed beyond the limits of the harbor, under contract.

## BURIAL OF THE DEAD.

Upon the receipt of a certificate of death, signed either by a regular physician or by a coroner, permits to bury the dead are issued by the board.

## INFECTIOUS DISEASES.

Small-pox patients are, if possible, isolated at their residences; otherwise they are removed to the small-pox hospital on Blackwell's island. This hospital is for all contagious diseases, but a new and more complete establishment will soon be erected, probably on North Brother island. Scarlet-fever patients are generally quarantined at home, but in special cases they are sent to the hospital. The board takes cognizance of contagious diseases everywhere, the board of education having stringent rules, approved by the board of health, for the regulation of all diseases of this character making their appearance in the public schools of the city. Every practicing physician in the city must report to the board all cases of contagious diseases which he may be called on to attend, within twenty-four hours of his knowledge of the same, and is also required to report, within the same length of time, all deaths from contagious diseases coming under his knowledge. All keepers of hotels, inns, boarding-houses, etc., are required to make the same reports regarding any cases of contagious diseases. Vaccination is not compulsory, but free vaccination is offered to all through a house-to-house visitation.

## REGISTRATION AND REPORTS.

All diseases, births, deaths, and marriages are regularly reported to the board, and are all recorded by the bureau maintained for that purpose. The board reports quarterly to the mayor, and the report is published in the city record.

Colonel Emmons Clark, secretary of the board, who furnished the Census Office with the above information regarding the health department of New York, concludes his report as follows: "The relations between this board and the medical profession are intimate and cordial, and they co-operate in securing sanitary improvements, and in all matters relating to the public health."

## MUNICIPAL CLEANSING.

At the present time (1880) the problem of having the streets of New York properly cleaned is becoming a very serious matter to the citizens, and from the numberless complaints in the daily papers, indications of a thorough overhauling of the system now in use seems to be inevitable. By the laws of 1872 the board of police in the city of New York has exclusive power, and is charged with the duty of causing all streets, avenues, lanes, gutters, wharves, piers, and heads of slips to be thoroughly cleaned from time to time, and kept at all times thoroughly cleaned. It is to remove from the city daily, and as often as may be necessary, ashes, garbage, rubbish, and sweepings of every kind, except such ashes and dirt as in the judgment of the board of health may be suitable to fill low sunken lots. The statute also places at the disposal of the board suitable and sufficient docks, piers, slips, and berths in slips necessary for the carrying out of the work; authorizes it to contract for the sale of manure and sweepings and garbage, the proceeds to be applied to the reduction of the expenses of the work, and empowers it to appoint such officers, agents, and employes as it may find necessary to perform such duties as can not well be done by members of the police force; to fix their compensation, employ laborers, and hire horses, carts, boats, and other materials that may be necessary for the proper performance of its duties. The money to meet the expenditures of the board is fixed annually by the board of apportionment, after the estimate has been considered and reissued by the police commissioners and inserted in the tax-levy.

By the laws of 1873 the board of police was further directed to establish in its department a bureau to be called the "bureau of street-cleaning", the chief officer of which is called the "inspector of street-cleaning", and is detailed from the regular force. Under the supervision of this board the inspector has charge of the cleaning of streets, avenues, and public places of the city; he superintends and enforces the performance of all existing contracts for such cleaning, or for the removal of night-soil, contents of sinks and privies, offal, dead animals, etc., and has full charge of all work performed by the bureau or ordered by the board of health. He has one assistant. The city is divided into twenty-four districts, corresponding very nearly with the several wards, and in each district there is a foreman who has control of the men working in that district.

<sup>a</sup> This, the official statement of the case, would hardly meet with unanimous concurrence.

The following is an exhibit of operations by the board of police in street-cleaning from January 1, 1873, to December 31, 1880:

Years.	Miles of streets cleaned.	LOADS REMOVED.					Total amount expended.	Cost per load.	Cost per mile.
		Total.	Dirt.	Garbage.	Ashes.	Snow.			
1873..	11,151	1,147,930	347,677	-----	800,253	-----	\$1,097,384 33	\$0 95	\$98 41
1874..	12,948	1,030,334	269,970	7,817	752,547	-----	\$29,928 07	80	04 10
1875..	9,947	1,088,405	247,136	13,101	770,957	57,271	\$61,405 33	74	80 56
1876..	11,286	1,017,993	221,030	14,093	775,420	6,550	\$25,000 00	71	04 24
1877..	7,082	1,017,318	244,042	-----	733,981	39,295	\$21,888 41	70	101 03
1878..	17,761	1,131,599	283,836	4,764	823,856	19,643	\$88,672 77	61	38 77
1879..	14,986	1,148,636	273,891	47,555	803,203	23,987	\$63,604 86	58	44 28
1880..	5,766	1,040,179	202,631	16,357	799,526	21,665	\$42,500 00	62	111 43

The total value of the stock and plant on hand at the end of the year was \$192,875, including scows, tugs, carts, horses, sweeping-machines, etc.

The principal causes of complaint of the present system are: A general disregard of the health ordinances in the matter of mixing garbage, ashes, and street-dirt; the unloading of sweepings, etc., in the bay and lower harbor; and the general failure of the bureau to keep the streets in a proper state of cleanliness. The ordinances on the subject are ample to cover all points, and the citizens will doubtless soon devise a plan that will work more satisfactorily than the one now in use seems to do.

*Dead animals, etc.*—The removal of all carcasses of animals dying in the streets of New York is done by the city under contract, the contractor being the same for both New York and Brooklyn. It is the duty of all police officers to note the dead animals passed on their respective beats, the same being reported to the station-houses, designating the locality where the carcass may be found. These reports are telegraphed to the central station three times daily, and the contractor, who has been notified, removes the carcasses in covered carts to the steamboat at the foot of West Thirty-eighth street. The carcasses are then taken to a rendering-establishment on Barren island, 28 miles from the city, and there utilized. The annual cost of this removal, which also includes offal and night-soil, is \$36,000, and the contractor estimates that he removes annually about 15,000 horses and cows (principally the former), and about 40,000 cats and dogs. The police estimate is, however, much under this, as the city record gives the number of all dead animals removed annually as 32,330.

The system works in a satisfactory manner and is regarded as economical. Dead animals seldom remain longer than three or four hours in the streets, for not only do the police and inspectors of the board of health keep close watch, but any citizen can report the existence of a carcass in the streets, and his complaint will at once receive attention.

Offal is put in barrels and carried to the steamboat that removes the carcasses, some 300 barrels being taken down to Barren island daily. The night-soil is dumped into scows and taken to Little Washington, New Jersey, where it is made into a fertilizer.

#### POLICE.

The police force of New York is appointed and governed by the board of police commissioners, a body composed of four members, who are nominated by the mayor and confirmed by the board of aldermen. The commissioners hold office for six years, and regulate the government and discipline of the force by rules and regulations prescribed by them. Members of the force hold office during good behavior, and are removed only after charges have been preferred against them and the same have been publicly examined into, the accused always being allowed ample time for his defense. By the state laws, the force consists of 1 superintendent, 3 inspectors, and as many captains, sergeants, roundsmen, patrolmen, doormen, etc., as the board of police may from time to time determine and the funds for the purpose may allow, provided that the number of patrolmen shall not be increased in any one year more than 100 beyond the number authorized the previous year. The board can also appoint 22 surgeons of police, one of whom is called the chief surgeon. In case of any riot or emergency, the board can appoint as many special policemen, without pay, from among the citizens as it may deem desirable. The board, with the approval of the mayor, can demand the assistance of the military, and the commanding officers of the troops called upon must obey the order.

During the year 1880 the number of members of the force of the several grades, including the surgeons, averaged 2,532 men, including detectives, steamboat squads, etc. Their uniform consists of dark-blue clothing, with brass buttons, helmet-hats, and white gloves, and is generally known to the country at large as the "metropolitan police uniform". From the quarterly reports of the police commissioners during the year 1880 it appears that the total number of arrests during that period was 71,540, the principal causes being: Assaults (various), 6,878; burglary, 795; disorderly conduct, 14,250; intoxication, etc., 30,046; larceny (in all grades), 5,256; suspicious persons, 2,947; vagrancy, 1,686; violating city ordinances, 2,342; and violating the excise law, 1,105. The total number of principal felonies was 4,134, disposed of as follows: Discharged without trial, 1,329; tried and acquitted,



225; convicted and sent to the penitentiary for terms varying from a life-sentence to  $1\frac{1}{2}$  year, 1,203; turned over to other authorities, 57; and still pending, 1,320. Of the social condition of those arrested, 24,387 were married and 47,153 were unmarried. During the year there were 123,955 station-house lodgers, 61,653 of whom were males and 62,302 females. From the report of the property clerk the total value of lost and stolen property delivered to owners during the year from the central office was \$39,082; and during the same time the amount of property taken from prisoners and returned to them was \$772,100.40. During the year the police recovered 5,046 lost children—3,044 males and 2,002 females—that were disposed of as follows: 4,880 sent home and 166 to charitable institutions.

Under the "discipline of the force" it is seen that during 1880, 1,619 charges were preferred against members. Of these cases 23 resulted in dismissal, in 775 fines were imposed, 99 were reprimanded, 632 complaints were dismissed or withdrawn, and 90 charges remained on hand at the end of the year. The deaths among members of the force during the past year aggregated 38. The total expenditures during 1880 on account of the police force proper amounted to \$3,292,365 47.

#### FIRE DEPARTMENT.

The annual report of the commissioners of the fire department for the year 1880 shows the following: The total force of the department is 892, being, at headquarters, including the commissioners, 21; uniformed force, 748; assistant pilot, 1; stokers, 3; bureaus of combustion, 10; fire-marshal's bureaus, 5; bureaus of building, 21; telegraph department, 16; repair-shops, 59, and hospital stables, 8. During the year there were 24 resignations, 19 dismissals, 14 retired, 13 deaths, 124 appointments, 45 promotions, 246 transfers, 2 reductions, and 1 reinstatement. The fines imposed for infraction of discipline amounted to \$1,029 30, and for loss of badges, etc., \$39 50. The amount of contracts awarded for feed, fuel, engines, hose, engine-houses, telegraph wires, etc., aggregated \$127,933, and the total amount received from the sales of condemned materials, etc., was \$3,000 76.

The apparatus consists of 38 steam fire-engines drawn by horses; 5 steam fire-engines that are self-propelling; 5 four-wheeled and 39 two-wheeled hose-tenders; 19 hook-and-ladder trucks; 1 wrecking-truck; 13 fuel-wagons, and 109 chemical fire-extinguishers. There is in use 37,450 feet of combination hose, 66,900 feet of cotton-lined hose, and 6,500 feet of 1-inch chemical rubber hose. The department has 4,986 telegraph-poles, 808 miles of wire, and 578 street alarm-boxes.

During the year there were 1,783 fires, 1,021 having been announced by telegraph and 762 reported by other means. Of the latter, 207 were discovered by firemen, 301 by policemen, 7 by tower watchmen, and the remainder by citizens. There were 1,252 fires extinguished by buckets of water, 22 by chemical engines, 246 by one engine-stream, and 263 by more than one engine. In 1,665 cases the fires were confined to the building in which they originated; and there were but few fires where the loss exceeded \$100,000, viz, one involving a loss of \$750,000, one \$204,150, one \$517,342, and one \$108,700. The consumption of water at the fires during the year by engines, including that drawn from the harbor by the steamboat "Havemeyer", was 32,102,000 gallons, or a little less than one-third of the city's daily supply.

The following table shows the number of fires, losses, etc., during the past fifteen years, as well as the number of men and companies in the department in the various years:

Year.	No. of fires.	Aggregate loss.	Average loss.	No. of companies.	No. of men.
1866.....	796	\$6,428,000	\$8,075 38	54	904
1867.....	873	5,711,000	6,541 81	54	910
1868.....	740	4,342,000	5,867 57	52	592
1869.....	850	2,606,393	3,172 23	52	599
1870.....	964	2,120,212	2,199 39	52	596
1871.....	1,258	2,127,356	1,691 06	52	596
1872.....	1,649	2,891,313	1,753 38	52	596
1873.....	1,470	4,022,640	2,786 49	54	651
1874.....	1,255	1,430,306	1,130 09	64	712
1875.....	1,418	2,472,536	1,743 68	67	748
1876.....	1,382	2,851,213	2,063 11	68	747
1877.....	1,450	3,210,695	2,214 27	65	752
1878.....	1,654	1,834,505	1,109 13	65	727
1879.....	1,551	5,671,580	3,656 72	64	729
1880.....	1,788	8,183,440	1,785 44	65	748
	19,093	50,993,194	2,670 78		

The chief engineer in his report commends the general condition of the force, apparatus, etc. The quickest time in hitching, in seconds, is as follows: To engine,  $3\frac{1}{4}$ ; to trucks,  $2\frac{1}{2}$ ; to tenders,  $2\frac{1}{4}$ . The slowest time (in seconds) was, to engines,  $14\frac{1}{2}$ ; to trucks,  $14\frac{1}{8}$ ; and to tenders,  $11\frac{1}{2}$ . The average time of hitching to all apparatus, for the past year, was  $8\frac{1}{4}$  seconds. During the year, 3 members of the department were fatally injured, 25 were seriously injured, and 123 slightly. Of citizens, 12 were fatally, 50 seriously, and 14 slightly injured.

## FINANCE.

The following, regarding the financial condition of New York, is taken from the message of the mayor dated January 5, 1880:

The funded debt of the city on the 30th of November, 1879, amounted to .....	\$122,967,833
Assessment bonds outstanding .....	13,325,100
Debt exclusive of revenue bonds .....	136,292,933
Debt of Morrisania, West Farms, and Westchester assumed by the city .....	1,036,614
Total .....	137,328,947
Deduct sinking fund .....	32,800,751
Net funded debt .....	104,528,196

At the same date there were revenue bonds outstanding as follows:

Payable from taxes of 1877 .....	\$150,000
Payable from taxes of 1878 .....	2,031,000
Payable from taxes of 1879 .....	10,805,500
Issued under special laws .....	13,966
Total .....	13,000,466
The personal taxes uncollected December 22, 1879, amounted to .....	\$11,475,380
The uncollected taxes on real estate November 30, 1879, amounted to .....	13,744,883
The uncollected assessments November 1, 1879, amounted to .....	9,437,891
Total .....	34,658,154

A large portion of the personal taxes are of long standing, and probably will never be collected. Property upon which assessments were laid several years ago, and which until recently could not have been sold for the amount of the assessments, has so increased in value that owners are now paying off arrears of assessments to a very considerable extent. It requires only an impartial execution of the law, and the abstention by the legislature from interference for the benefit of special interests, to bring a large proportion of overdue assessments into the city treasury.

More than forty years ago the sinking funds of the city were established for the purpose of retaining certain revenues in trust for the payment of the principal and interest of certain portions of the funded debt of the city. These revenues, solemnly pledged to a well-defined object, have increased with the growth of the city, and the wise policy of an earlier era has resulted in providing funds which will in about twenty-five years pay off the entire amount of the present debt. These revenues can not be otherwise applied, and by the very force of law will work out that result if new obligations are not incurred to increase the debt.

## COMMERCE AND NAVIGATION.

[From the reports of the Bureau of Statistics for the fiscal years ending June 30.]

Customs district of New York.	1879.	1880.
Total value of imports .....	\$314,115,362	\$543,695,898
Total value of exports:		
Domestic .....	\$338,817,546	\$368,441,664
Foreign .....	\$12,400,385	\$12,192,062
Total number of immigrants .....	90,224	203,726

Customs district of New York.	1879.		1880.	
	Number.	Tons.	Number.	Tons.
Vessels in foreign trade:				
Entered .....	7,563	6,661,826	8,141	7,611,282
Cleared .....	6,937	6,404,847	7,384	7,420,802
Vessels in coast trade and fisheries:				
Entered .....	2,014	1,716,155	2,255	1,928,585
Cleared .....	3,135	2,068,817	3,908	2,414,955
Vessels registered, enrolled, and licensed in district ..	4,859	1,025,641	4,123	950,058
Vessels built during the year .....	165	11,265	103	7,074

## MANUFACTURES.

The following is a summary of the statistics of the manufactures of New York for 1880, being taken from tables prepared for the Tenth Census by Charles E. Hill, chief special agent:

Mechanical and manufacturing industries.	No. of establishments.	Capital.	AVERAGE NUMBER OF HANDS EMPLOYED.			Total amount paid in wages during the year.	Value of materials.	Value of products.
			Males above 16 years.	Females above 15 years.	Children and youths.			
All industries.....	11, 330	\$181, 206, 356	146, 179	71, 705	9, 378	\$97, 030, 021	\$288, 441, 691	\$472, 926, 437
Artificial feathers and flowers (see also Millinery and lace goods).....	141	1, 090, 100	453	2, 941	104	934, 768	2, 241, 302	4, 298, 684
Artificial limbs (see also Surgical appliances).....	7	23, 500	17	.....	.....	11, 137	0, 050	44, 020
Awnings and tents.....	23	108, 600	120	77	7	74, 212	314, 808	457, 035
Bags, other than paper.....	7	655, 500	259	406	82	317, 850	2, 919, 000	3, 584, 300
Bags, paper.....	10	69, 700	123	95	.....	74, 709	154, 600	299, 847
Baskets, rattan and willow ware.....	21	82, 080	69	29	8	85, 715	77, 822	171, 030
Belting and hose, leather.....	11	899, 209	234	18	5	150, 694	1, 362, 800	1, 099, 729
Billiard tables and materials.....	7	315, 460	100	.....	2	63, 174	278, 443	439, 330
Blacking.....	4	110, 500	86	.....	.....	50, 500	171, 000	432, 060
Blacksmithing (see also Wheelwrighting).....	205	282, 463	548	.....	31	367, 959	284, 517	937, 144
Bookbinding and blank-book making.....	114	2, 340, 650	1, 837	2, 059	172	1, 553, 704	2, 290, 627	4, 027, 886
Boot and shoe findings.....	7	22, 350	27	8	14	18, 687	34, 682	81, 100
Boot and shoe uppers.....	18	45, 934	48	33	2	33, 468	97, 952	180, 702
Boots and shoes, including custom work and repairing.....	839	1, 898, 669	4, 320	1, 078	183	2, 474, 050	3, 621, 822	7, 663, 000
Boxes, cigar.....	20	340, 800	441	225	144	301, 042	433, 218	1, 035, 549
Boxes, fancy and paper.....	55	672, 075	615	1, 055	85	671, 020	1, 044, 409	2, 173, 565
Boxes, wooden packing.....	33	358, 500	491	.....	24	306, 082	715, 790	1, 243, 844
Brass castings.....	64	885, 171	1, 074	62	194	570, 971	884, 737	1, 826, 845
Bread and other bakery products.....	782	2, 032, 036	2, 443	283	111	1, 275, 723	6, 045, 762	9, 415, 424
Brooms and brushes.....	45	729, 750	506	146	42	281, 924	981, 918	1, 573, 561
Buttons.....	9	155, 000	93	693	66	178, 018	167, 336	401, 027
Carpentering.....	460	1, 745, 782	3, 438	.....	61	2, 242, 000	3, 454, 265	7, 090, 315
Carriages and sleds, children's.....	9	127, 000	267	7	4	127, 280	210, 840	434, 500
Carriages and wagons (see also Wheelwrighting).....	189	1, 133, 900	1, 517	.....	85	905, 719	1, 041, 825	2, 013, 361
Cars, railroad, street, and repairs.....	13	816, 748	339	.....	9	200, 776	200, 532	547, 037
Chocolate.....	4	55, 500	39	44	.....	26, 203	157, 403	237, 153
Cloth finishing.....	8	13, 600	42	.....	2	17, 188	26, 656	91, 129
Clothing, men's.....	736	22, 396, 893	30, 444	16, 972	231	14, 012, 805	40, 209, 340	60, 798, 697
Clothing, women's.....	280	4, 805, 665	1, 569	10, 750	47	3, 880, 715	11, 745, 305	18, 930, 553
Coffee and spices, roasted and ground.....	30	1, 439, 650	303	64	13	267, 070	4, 760, 520	5, 974, 458
Coffins, burial cases, and undertakers' goods.....	45	530, 500	273	136	9	218, 175	525, 503	1, 008, 103
Combs.....	3	2, 300	10	.....	1	7, 008	4, 125	13, 719
Confectionery.....	187	1, 521, 758	1, 003	629	115	542, 775	3, 057, 999	4, 592, 022
Cooperage.....	44	257, 800	450	.....	5	243, 922	501, 288	895, 571
Coppersmithing (see also Tinware, copperware, and sheet-iron ware).....	25	435, 702	368	.....	1	260, 184	501, 313	925, 289
Cork cutting.....	11	53, 000	31	19	4	20, 710	55, 660	121, 148
Corsets.....	21	179, 900	61	950	104	193, 493	383, 061	685, 273
Cotton goods (see also Hosiery and knit goods; Mixed textiles).....	5	522, 500	120	79	36	90, 704	367, 188	532, 542
Cutlery and edge tools (see also Hardware).....	21	41, 000	60	.....	2	43, 791	17, 113	93, 760
Drugs and chemicals (see also Patent medicines and compounds).....	27	2, 027, 923	383	198	7	305, 969	2, 639, 415	3, 694, 178
Dyeing and cleaning.....	27	80, 825	44	20	.....	28, 845	18, 820	82, 750
Dyeing and finishing textiles.....	23	475, 500	373	54	20	247, 445	194, 544	690, 236
Electroplating.....	58	170, 050	385	44	27	213, 405	153, 812	572, 718
Enameling.....	8	16, 700	14	0	.....	8, 820	9, 174	38, 083
Engravers' materials.....	7	48, 200	50	3	.....	32, 320	21, 904	70, 500
Engraving and die-sinking.....	98	143, 780	252	4	47	143, 792	89, 636	448, 486
Engraving, steel.....	21	531, 300	455	189	60	1, 154, 510	384, 214	1, 798, 550
Engraving, wood.....	58	16, 178	133	4	5	102, 986	13, 709	218, 305
Fancy articles.....	48	433, 700	593	328	52	362, 569	392, 849	1, 061, 205
Fertilizers.....	8	502, 000	193	.....	5	88, 463	172, 122	314, 961
Flags and banners.....	4	32, 000	5	31	.....	14, 800	25, 500	60, 000
Flavoring extracts.....	5	19, 500	14	5	1	8, 625	38, 648	63, 362
Flouring- and grist-mill products.....	15	1, 870, 025	418	.....	.....	289, 741	5, 183, 154	6, 229, 926
Food preparations.....	10	237, 000	85	26	3	60, 263	338, 857	476, 901
Foundry and machine-shop products (see also Steam fittings and heating apparatus).....	287	10, 035, 508	9, 352	31	870	5, 373, 142	6, 223, 805	14, 710, 835

Mechanical and manufacturing industries.	No. of establishments.	Capital.	AVERAGE NUMBER OF HANDS EMPLOYED.			Total amount paid in wages during the year.	Value of materials.	Value of products.
			Males above 16 years.	Females above 15 years.	Children and youths.			
Fruits and vegetables, canned and preserved.....	4	\$200,000	69	178	.....	\$56,200	\$335,000	\$450,000
Furnishing goods, men's.....	49	1,377,200	348	1,829	30	719,897	2,435,352	4,038,380
Furniture (see also Mattresses and spring beds; Upholstering).....	299	4,353,683	5,531	102	215	3,361,306	4,204,602	9,605,779
Furs, dressed.....	60	1,950,875	830	1,588	22	868,615	2,943,357	4,474,018
Galvanizing.....	8	273,000	229	.....	12	122,620	351,800	850,770
Gas and lamp fixtures.....	14	2,105,000	1,369	28	95	793,678	965,565	2,549,628
Glass, cut, stained, and ornamented.....	98	557,080	813	86	127	432,500	845,654	1,747,501
Gloves and mittens (see also Hosiery and knit goods).....	5	492,000	31	127	.....	63,000	569,950	916,500
Gold and silver leaf and foil.....	20	144,500	240	102	8	177,690	320,810	554,172
Gold and silver, reduced and refined.....	8	143,000	78	.....	.....	52,852	2,525,795	2,614,877
Grease and tallow.....	11	461,334	278	3	6	100,074	6,242,761	6,871,175
Hairwork.....	43	132,575	67	230	11	111,512	236,046	510,309
Hand-knit goods.....	6	3,100	2	42	.....	7,162	8,917	10,722
Hand-stamps.....	13	33,200	48	.....	1	25,478	23,330	99,560
Hardware (see also Cutlery and edge tools).....	67	568,500	923	18	77	543,979	615,199	1,479,492
Hat and cap materials.....	38	387,228	408	274	15	275,214	651,092	1,157,626
Hats and caps, not including wool hats.....	111	1,033,575	1,283	1,302	46	1,120,846	2,067,700	4,008,503
Hosiery and knit goods (see also Cotton goods; Gloves and mittens).....	8	310,000	81	307	53	174,349	376,760	664,214
Housefurnishing goods.....	5	11,250	21	.....	11	11,108	9,964	27,243
Ink.....	3	59,000	24	10	7	13,030	130,000	181,500
Instruments, professional and scientific.....	44	304,750	235	4	8	143,446	97,430	389,307
Iron bolts, nuts, washers, and rivets.....	9	115,050	122	6	2	60,849	144,720	249,222
Iron pipe, wrought.....	7	329,500	142	.....	12	56,519	468,071	620,065
Iron railing, wrought.....	29	104,450	180	.....	5	119,352	146,915	358,170
Ivory and bone work.....	8	166,972	171	59	14	91,040	191,774	333,919
Japanning.....	9	8,750	22	.....	15	13,876	4,283	30,100
Jewelry.....	240	2,531,838	1,902	213	106	1,365,611	2,533,916	5,002,193
Kindling wood.....	41	475,850	442	8	88	217,042	727,958	1,219,688
Lamps and reflectors.....	20	267,000	296	3	9	171,499	243,739	602,567
Lapidary work.....	26	99,250	90	11	16	89,226	128,682	313,230
Lead, refined.....	11	766,366	492	.....	10	254,883	14,317,826	14,758,718
Lasts.....	3	7,500	19	2	.....	9,219	3,600	28,516
Lead, bar, pipe, sheet, and shot.....	7	848,575	95	3	1	53,145	1,189,492	1,619,217
Leather, curried.....	14	234,110	78	.....	.....	50,363	336,532	447,319
Leather goods.....	45	481,100	781	129	37	425,290	951,573	1,762,278
Leather, tanned.....	9	1,065,500	375	23	17	171,418	929,219	1,161,177
Liquors, malt.....	79	13,491,000	4,245	.....	.....	2,115,067	10,717,421	19,137,882
Lithographing (see also Printing and publishing).....	48	1,227,550	968	54	117	667,762	602,900	1,738,452
Lock- and gun-smithing.....	70	65,625	96	2	23	63,143	67,547	214,110
Looking-glass and picture frames.....	81	680,350	923	7	61	423,925	1,177,407	2,071,565
Lumber, planed (see also Sash, doors, and blinds; Wood, turned and carved).....	43	883,197	736	.....	26	425,983	1,152,880	2,220,910
Malt.....	15	3,150,000	399	.....	.....	223,678	2,634,413	3,350,731
Marble and stone work.....	146	2,267,388	2,830	.....	99	2,080,563	2,193,983	5,771,069
Masonry, brick, and stone.....	90	668,650	1,161	.....	20	708,777	1,133,852	2,334,659
Mattresses and spring beds (see also Furniture).....	21	327,750	206	83	9	150,215	671,068	1,023,494
Millinery and lace goods (see also Artificial feathers and flowers).....	88	1,251,180	678	2,665	128	996,489	3,237,908	5,153,080
Mineral and soda waters.....	27	485,948	384	.....	41	242,582	302,387	784,373
Mixed textiles (see also Cotton goods; Silk and silk goods).....	74	1,787,350	1,372	2,834	495	1,286,649	2,336,577	4,825,424
Models and patterns.....	21	24,300	64	.....	3	44,621	18,180	100,760
Musical instruments, organs and materials.....	34	346,325	216	8	20	146,893	114,581	371,421
Musical instruments, pianos and materials.....	48	4,462,370	3,213	.....	32	2,821,687	2,972,765	6,913,691
Oil, lubricating.....	4	36,200	17	.....	.....	7,300	58,000	78,750
Oleomargarine.....	4	610,500	248	.....	.....	113,676	4,322,095	5,215,393
Painting and paperhanging.....	293	841,914	1,794	19	39	1,090,719	1,186,478	3,058,487
Paints.....	26	1,581,000	439	22	24	250,865	2,144,321	2,932,049
Paperhangings.....	11	1,965,000	825	84	420	415,120	2,054,104	3,400,143
Patent medicines and compounds (see also Drugs and chemicals).....	44	826,500	176	193	22	146,773	570,392	1,302,313
Pens, gold.....	8	227,550	121	5	16	116,270	142,366	365,782
Perfumery and cosmetics.....	16	377,450	135	162	4	92,237	625,900	1,094,706
Photographing.....	110	441,100	583	162	23	363,158	243,177	1,140,427

Mechanical and manufacturing industries.	No. of establishments.	Capital.	AVERAGE NUMBER OF HANDS EMPLOYED.			Total amount paid in wages during the year.	Value of materials.	Value of products.
			Males above 10 years.	Females above 15 years.	Children and youths.			
Pickles, preserves, and sauces.....	18	\$294,700	102	65	30	\$47,660	\$272,250	\$527,856
Pipes, tobacco.....	10	85,700	152	13	11	87,253	102,788	262,188
Plumbing and gasfitting.....	401	967,853	1,889	1	118	1,128,260	1,869,728	3,900,414
Pocket-books.....	33	282,050	489	76	54	284,173	530,373	1,028,352
Printing and publishing (see also Lithographing).....	412	14,774,929	8,015	979	584	5,876,803	7,859,559	21,696,354
Printing and materials.....	5	64,000	43	.....	5	28,850	79,100	151,000
Pumps, not including steam-pumps.....	14	54,650	51	.....	.....	35,323	70,896	151,994
Refrigerators.....	18	208,528	236	1	8	116,067	270,224	503,869
Regalia and society banners and emblems.....	12	161,200	56	16	3	30,471	59,701	142,363
Roofing and roofing materials.....	88	260,730	499	.....	16	294,540	483,561	993,110
Rubber and elastic goods.....	14	425,200	242	149	14	189,425	495,338	859,262
Saddlery and harness.....	174	400,272	520	13	30	314,444	405,032	1,037,768
Safes, doors, and vaults, fire-proof.....	5	304,000	302	.....	15	169,508	248,410	518,516
Sash, doors, and blinds (see also Lumber, planed; Wood, turned and carved).....	29	241,600	461	.....	9	258,017	481,458	867,695
Scales and balances.....	6	167,500	81	.....	1	55,304	66,186	168,234
Sewing-machines and attachments.....	6	61,500	180	3	13	110,900	71,950	269,100
Shipbuilding.....	79	1,409,100	941	.....	.....	778,728	915,110	2,071,005
Shirts.....	64	1,647,700	574	2,814	13	1,195,581	3,574,215	5,608,015
Show-cases.....	14	45,500	94	.....	1	55,123	76,300	168,980
Silk and silk goods (see also Mixed textiles).....	126	3,431,450	1,975	4,531	1,435	2,079,535	3,857,330	7,800,250
Silverware.....	16	1,049,600	682	28	95	556,903	688,402	1,527,600
Slaughtering and meat-packing, not including retail butchering.....	58	1,801,000	876	.....	19	575,521	27,763,577	29,297,527
Soap and candles.....	30	2,931,325	496	85	53	275,804	2,790,545	3,697,964
Spectacles and eyeglasses.....	23	49,450	83	.....	7	46,662	32,493	120,808
Sporting goods.....	14	613,000	120	257	17	127,643	109,582	486,417
Stamped ware (see also Tinware, copperware, and sheet-iron ware).....	8	49,140	44	.....	33	28,180	41,941	97,280
Stationery goods.....	73	1,500,925	925	664	92	676,547	1,840,317	3,179,734
Steam fittings and heating apparatus (see also Foundry and machine-shop products).....	16	712,500	481	.....	5	305,198	848,268	1,295,259
Stone and earthen-ware.....	8	183,900	189	11	6	90,828	70,020	209,000
Sugar and molasses, refined.....	5	2,780,000	554	.....	.....	255,783	10,677,746	11,330,883
Surgical appliances (see also Artificial limbs).....	11	40,600	16	12	1	9,068	11,243	60,448
Telegraph and telephone apparatus.....	21	299,508	379	31	6	263,444	305,560	763,439
Tinware, copperware, and sheet-iron ware (see also Coppersmithing; Stamped ware).....	177	993,720	1,419	22	164	748,208	1,611,389	3,063,501
Tobacco, chewing, smoking, and snuff (see also Tobacco, cigars and cigarettes).....	17	1,015,540	326	750	46	645,237	2,637,697	4,320,072
Tobacco, cigars and cigarettes (see also Tobacco, chewing, smoking, and snuff).....	761	5,858,443	9,423	4,575	478	6,066,455	8,805,147	18,347,108
Toys and games.....	15	143,550	218	195	57	83,689	96,783	257,113
Trunks and valises.....	34	226,050	270	18	22	171,716	300,581	666,766
Type founding.....	20	779,500	413	106	54	326,856	224,850	793,257
Umbrellas and canes.....	61	989,550	540	786	19	520,739	2,424,070	3,456,144
Upholstering (see also Furniture).....	91	592,037	452	232	98	294,840	1,255,276	1,952,289
Vault lights and ventilators.....	10	128,450	89	.....	.....	50,285	75,140	210,216
Vinegar.....	5	121,509	32	.....	2	17,116	143,500	205,050
Watch and clock repairing.....	55	163,255	140	3	2	89,990	207,515	361,641
Whalebone and rattan.....	6	71,950	47	7	.....	24,997	223,016	277,000
Wheelwrighting (see also Blacksmithing; Carriages and wagons).....	175	210,680	430	.....	19	251,290	263,093	756,406
Window blinds and shades.....	11	146,350	109	11	4	81,064	101,850	232,000
Wirework.....	38	478,100	561	42	160	373,066	540,618	1,250,306
Wood, turned and carved (see also Lumber, planed; Sash, doors, and blinds).....	94	507,520	784	3	38	441,547	673,614	1,351,789
All other industries (a).....	53	5,701,150	1,581	1,809	266	1,479,670	5,693,964	8,908,184

a Embracing axle-grease; babbitt metal and solder; baking and yeast powders; bluing; bridges; brick and tile; bronze castings; calcium lights; carpets, other than rag; cigar molds; cleansing and polishing preparations; cordage and twine; electrical apparatus; felt goods; files; gas machines and meters; iron and steel; iron forgings; iron work, architectural and ornamental; jewelry and instrument cases; labels and tags; matches; mirrors; musical instruments and materials (not specified); needles and pins; oil, lard; saws; shoddy; soda-water apparatus; springs, steel, car, and carriage; stereotyping and electrotyping; straw goods; taxidermy; tinfoil; wooden ware; and worsted goods.

From the foregoing table it appears that the average capital of all establishments is \$15,980 81; that the average wages of all hands employed is \$426 78 per annum; that the average outlay in wages, in materials, and in interest (at 6 per cent.) on capital employed is \$34,954 06.



# OGDENSBURG, SAINT LAWRENCE COUNTY, NEW YORK.

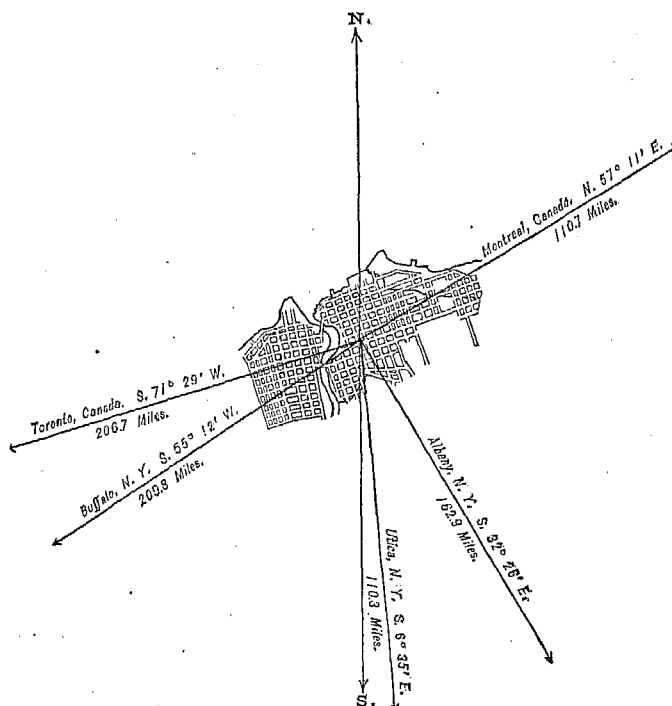
## POPULATION

IN THE  
AGGREGATE,  
1860-1880.

	Inhab.
1790.....	
1800.....	*100
1810.....	*600
1820.....	*700
1830.....	*2,000
1840.....	2,526
1850.....	*5,000
1860.....	7,409
1870.....	10,076
1880.....	10,341

\*Estimated.

**Latitude: 44° 41' North; Longitude: 75° 32' (west from Greenwich); Altitude: 232 feet. (a)**



## POPULATION

BY  
SEX, NATIVITY, AND RACE,  
AT  
CENSUS OF 1880.

Male.....	5,008
Female.....	5,333
<hr/>	
Native.....	6,874
Foreign-born.....	3,467
<hr/>	
White.....	10,328
Colored.....	13

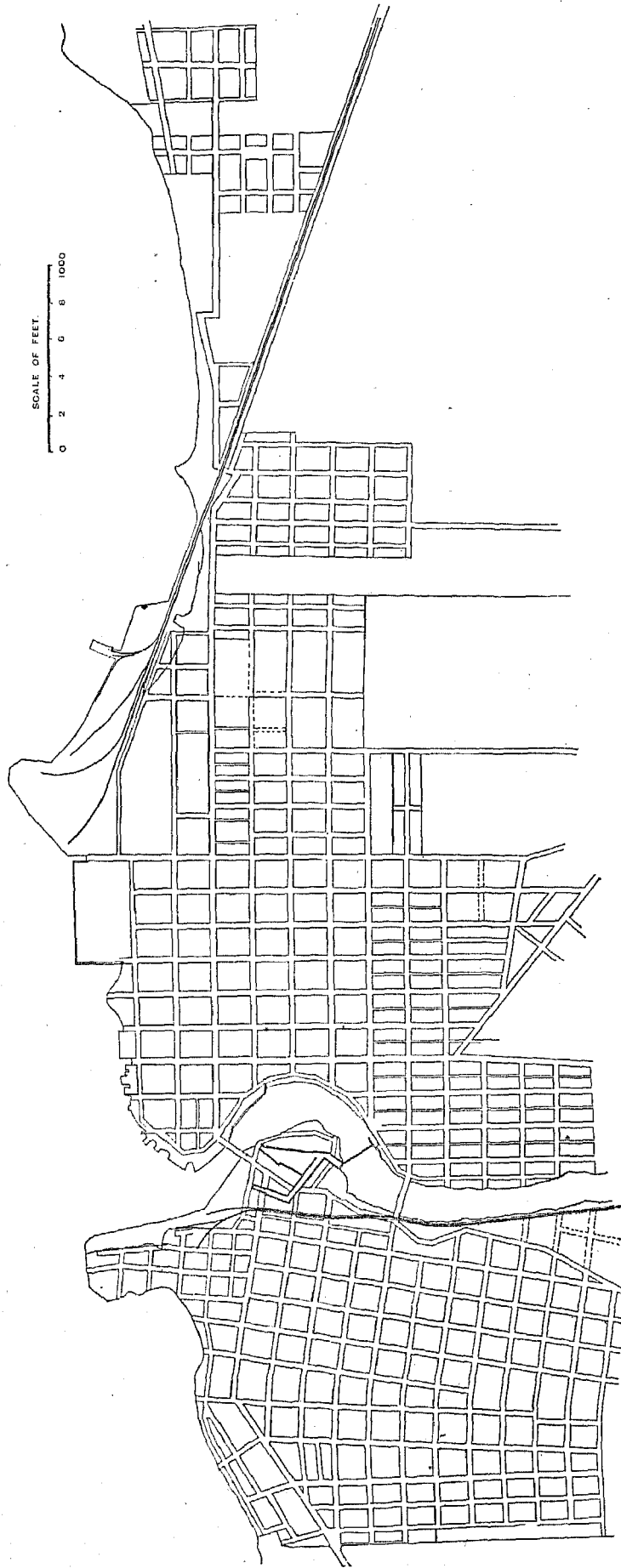
## FINANCIAL CONDITION:

Total Valuation: \$4,732,268; per capita: \$458 00.      Net Indebtedness: \$135,000; per capita: \$13 05.      Tax per \$100: \$1 36.

## HISTORICAL SKETCH.

The site of Ogdensburg was first settled by the Catholic missionary Abbé Piquet, who gave it the name of *Oswegatchie*. It is situated on the Saint Lawrence river at the mouth of the Oswegatchie river. The township was incorporated in 1802, and the village of Ogdensburg was incorporated in 1817. The completion of the Oswego canal assisted in the development of Ogdensburg, and the building of the Northern New York railroad, in 1850, gave a still more marked impetus to the place, and from that date the growth of the city has been rapid. It was incorporated in 1868 as a city. A destructive fire on the nights of April 16 and 17, 1839, laid nearly half the town in ashes, and destroyed nearly \$100,000 worth of property. Another severe fire occurred September 1, 1852.

OGDENSBURG, N. Y.



## OGDENSBURG IN 1880.

The following statistical accounts, collected by the Census Office, indicate the present condition of Ogdensburg :

## LOCATION.

The city lies in latitude  $44^{\circ} 41'$  north, longitude  $75^{\circ} 32'$  west from Greenwich, on the Saint Lawrence river, at the mouth of the Oswegatchie river, and about 200 miles northwest from Albany. The draft of water in the harbor is 11 feet, and the depth of water in the channel of the Saint Lawrence is 25 feet. There are at least 3 miles of docks within the city limits. The current of the river here is about 1 mile an hour. Communication by water is had with all ports upon the lakes and with the ports of the world; ships sailing direct from here to Chicago, by way of the Welland canal, and to Liverpool, England.

## RAILROAD COMMUNICATIONS.

The city has the following railroads: Ogdensburg and Lake Champlain railroad, from Ogdensburg to Rouse's Point; Utica and Black River railroad, from Ogdensburg to Utica; and the Rome, Watertown, and Ogdensburg railroad, from Ogdensburg to Rome. A ferry-boat connects Ogdensburg with the Grand Trunk railway and the Saint Lawrence and Ottawa railroad at Prescott, Canada.

## TRIBUTARY COUNTRY.

The farmers of the surrounding country are largely devoted to dairying. The lumber and flouring interests are very large. Being located at the foot of lake navigation, the city has a very large shipping trade. Much is also done in the way of transferring freight from railroads to boats, and *vice versa*.

## TOPOGRAPHY.

Within 5 miles south of the city the land is rather flat. The soil is light. The underlying and outcropping rock is limestone. The surrounding country within a radius of 5 miles is generally open. The natural drainage is excellent, both into the Saint Lawrence and the Oswegatchie rivers. There are no ponds or marshes near, except Black lake, whose outlet into the Oswegatchie river is within 4 miles of the post-office, and is surrounded by much swampy land.

## CLIMATE.

The highest recorded summer temperature is  $95^{\circ}$ ; highest summer temperature in average years,  $92^{\circ}$ . Lowest recorded winter temperature,  $-30^{\circ}$ ; lowest winter temperature in average years,  $-14^{\circ}$ . The Saint Lawrence river is thought to have an equalizing influence on the temperature and to purify the air. The prevailing winds are from the west, and appear to have no particular influence on the climate.

## STREETS.

The total length of streets is 40 miles, of which 10 miles is paved with broken stone, at a cost, as nearly as may be estimated, of 20 cents per square yard. The annual cost of keeping the streets in repair is \$2,000. Sidewalks are paved with wood and with Potsdam sandstone. Gutters are laid with cobble-stones. Residents here have taken much pains to plant shade-trees, chiefly hard and soft maples, opposite their dwellings on the line of the street, and between the sidewalks and gutters, where is usually a strip of grass 3 or 4 feet wide. The trees are set about 20 feet apart, and so general is the planting that Ogdensburg is sometimes called the "Maple City". The work of construction and repair is done under the direction of the street commissioners at an annual cost of from \$7,000 to \$8,000. Regarding the work on streets, Mayor Parker says:

The street-work in this city is a political machine, and therefore "by the day" is preferable. But I have no doubt that there could be more work done, for half the money expended, by contract, and I strongly advise that way.

A steam stone-crusher is used with good effect. There are no horse-railroads or omnibus lines in the city.

## WATER-WORKS.

The water-works are owned by the city, and their total cost is \$150,000. The Holly pumping system is used, and the ordinary pressure in the mains is 40 pounds to the square inch, which, in case of fire, is increased to 100 pounds to the square inch. The least amount pumped per diem is 800,000 gallons, and the greatest, except in case of fire, is 1,200,000 gallons. The average cost of raising 1,000,000 gallons 1 foot high is 3.45 cents. The yearly cost of maintenance, aside from the cost of pumping, is \$1,000, and the yearly income from water-rates is \$8,500. Water-meters are not used. The charge per 1,000 gallons (estimated) is 25 cents. There are laid 14 miles 1,491 feet of pipe. The total number of hydrants is 81.

## GAS.

The gas-works are owned by a private corporation. The daily average production is about 15,000 cubic feet, and the charge is \$4 per 1,000 feet. The city has 106 street-lamps, for which it pays \$2 per lamp for eighteen nights in each lunar month, to burn on an average five hours each night.

## PUBLIC BUILDINGS.

The city owns and occupies, for municipal uses, the town hall, in which are provided the common-council room, library, lockup, and recorder's court-room. The city and township, in common, are now building a new town hall to cost \$100,000, the city to own three-fifths of it and the township two-fifths.

## PUBLIC PARKS AND PLEASURE-GROUNDS.

Total area, 18 acres. There are one large park of 9 acres, and three small parks of about 3 acres each. Two of the smaller ones only are completed. All of these parks were presented to the city. The annual cost of maintenance for all the parks is \$1,000. They are controlled by five park commissioners appointed by the common council and serving without pay.

## PLACES OF AMUSEMENT

At present there are no theaters in the city. The new town hall, now building, is to include a theater with a seating capacity of 1,500. There are two concert- and lecture-halls—Eagle hall, with a seating capacity of 700, and Turn hall, seating 500. There are no concert- and beer-gardens.

## DRAINAGE.

Sewerage-works are built according to a plan (combined storm-water and house-drainage) prepared in 1872 by George E. Waring, jr., of Newport, Rhode Island, showing lines of main drainage for the whole city. This plan has been much changed by the city authorities. About 10 miles of sewers have been laid. The material used is vitrified clay pipes from 8 to 24 inches in diameter. The main sewers and outlets are to be of larger diameter and of brick.

The outfall for the sewers is to the Oswegatchie and the Saint Lawrence rivers. Mouths of outlets are submerged except in very low water. No provision for ventilation has been carried out. There has been no necessity for artificial flushing or cleansing by hand, the inclinations being considerable. It is reported that the liberal use of water from water-closets and the wash from streets keeps the sewers in good condition and prevents their becoming foul. The cost of several of the main lines of sewers has been assessed upon the whole area to be drained by them. When extensions are to be made or lateral sewers built, the city council establishes the size and depth and it is advertised for contract. The city pays for crossings and public squares, and the balance is assessed upon abutting property. Assessments are laid on the basis of frontage, and usually amount to about \$1 per foot each side of the street. Records of all sewers built are kept in the office of the city clerk.

## CEMETERIES.

No information on this subject was furnished.

## MARKETS.

There are no public or corporation markets in Ogdensburg. Isabella street, south side of Ford street, is used as an open market place for the sale of wood, hay, straw, etc. The supplying of the city with meat, poultry, fish, vegetables, etc., is done by private butchers and store-keepers.

## SANITARY AUTHORITY—BOARD OF HEALTH.

The chief sanitary authority of the city is vested in a board of health, an independent body composed of three members, two of whom are physicians, and a health officer, who also is a physician, appointed by the mayor. The annual expense of the board in ordinary times depends mostly on the amount of business done in the way of answering complaints lodged with the board. The members receive nothing for their services. The amount to which the board may increase its expenses during an epidemic is not limited. In the absence of an epidemic it has authority to order the removal of all nuisances, and during an epidemic to do all that may be necessary to prevent the spread of the same. The executive officer of the board is the health officer, who executes all its orders, and who is paid according to the amount of service performed. The board meets at irregular times, and decides upon its action by ballot. No assistant health officers or inspectors are employed. Inspections are not made regularly, but only as nuisances are reported to the health officer, who reports to the board, and it then takes action. The board has no custom regarding the inspection and correction of defective house-drainage, privy-vaults, cesspools,

sources of drinking water, sewerage, street-cleaning, etc. Neither does it exercise any control over the conservation and removal of garbage. The board has no regulations concerning the burial of the dead, the pollution of streams and harbors, or the removal of excrement.

#### INFECTIOUS DISEASES.

Small-pox patients are removed to the pest-house, situated on a point of land jutting out into the Saint Lawrence river. Scarlet-fever patients are not isolated. The board takes cognizance of the breaking out of contagious diseases in schools by forbidding the attendance of children in whose families such diseases exist. Vaccination is not compulsory, nor is it done at the public expense. There is no system of registration of diseases, births, and deaths. The board of health does not report.

#### MUNICIPAL CLEANSING.

*Street-cleaning.*—The streets are cleaned by the city and by the private abutters. The work is done wholly by hand, and the city's portion is done with its regular force. The principal business streets are cleaned once a week by the abutters, and the city gives all the streets a thorough cleaning every spring. The annual cost of this work to the city is \$500, and to the abutters about the same. The sweepings are taken to River Bank park and used for filling. The system is reported as being good and giving satisfaction.

*Removal of garbage and ashes.*—All garbage is removed by the householders. The final disposal of wood-ashes is to the "ashery", while coal-ashes are disposed of in the same manner as street-sweepings. No nuisance or probable injury to health is thought to result from improper keeping, from infrequent removal, or from final disposition of garbage, and the system of removal is reported as "all right".

*Dead animals.*—The carcass of any animal dying within the city is taken by the police and towed into the middle of the Saint Lawrence river. The annual cost of the service is slight, and no account is kept of the number so disposed of. The system is said to work well.

*Liquid household wastes.*—Chamber-slops are disposed of in the same way as laundry wastes and kitchen-slops. Nearly all of the liquid household wastes of the city are delivered into the public sewers.

*Human excreta.*—About one-tenth of the houses in the city have water-closets, and they all deliver into the sewers. It is not allowed to use night-soil for manuring land within the gathering-ground of the public water-supply.

*Manufacturing wastes.*—Liquid and solid manufacturing wastes are delivered into the river, and this disposal is thought to work no harm to health.

#### POLICE.

The police force is appointed by the common council, and is directly governed by the chief of police, who is the chief executive officer. His duties are to direct the force and to assign the members to duty. His salary is \$200 per year. The rest of the force consists of 5 patrolmen, who each receive \$15 per month for day service and \$1 per night. Their average earnings are \$40 per month each. The uniform consists of a blue frock-coat, pantaloons, and cap. The men provide their own uniforms. Each patrolman is armed with a club and revolver. The hours of service are from 7 p. m. to 5 a. m., and the whole city is patrolled. During the past year 122 arrests were made by the force, the principal causes being drunkenness, disorderly conduct, and larceny. In the final disposition of these cases, 6 were sent to the Onondaga penitentiary and 4 to the Western house of refuge. The amount of property lost and stolen during the year, and reported to the police, was small, the exact amount not being known. The number of station-house lodgers during the same time was not reported, but free meals were furnished to them at a cost of about \$25. The force is required, when so directed by the mayor or chief, to assist the fire department at fires. Special policemen are appointed and sworn in for special occasions, such as holidays, "fair days," visits of circuses, etc. They are paid by the city. The yearly cost of the force is about \$3,000. In sending the above information, the mayor of Ogdensburg adds the following note:

The town constables residing in the city can act as police, but receive pay only from the fees. Three justices of the peace residing in the city, but who are elected by the town of Oswegatchie, may perform the duties of recorder. Ogdensburg, though incorporated a city, still remains a portion of the town of Oswegatchie. The chief of police designates 4 of the 5 policemen for service each night, and directs them where to patrol. They have discovered many fires and put them out in their incipient stages. The police ring the fire alarm.

#### FIRE DEPARTMENT.

The manual force consists of 1 chief and 2 assistant engineers and 53 men, divided into 2 engine companies, 1 hook-and-ladder company, and 1 hose company. The apparatus in service consists of 2 first-class steamers, 1 hook-and-ladder truck, 3 hose-carts, and 1 old hose-cart. The amount of hose in use is 3,500 feet. During the year 1878-'79 the department was called out to fires 11 times. The expenses for the year were \$1,332 90.

#### PUBLIC SCHOOLS.

The number of school-rooms in the city is 29; number of teachers employed, 29; number of pupils enrolled, 1,917; average daily attendance, 1,112; amount paid for teachers' wages, \$10,118; and the average weekly wages paid each teacher, \$8 88.

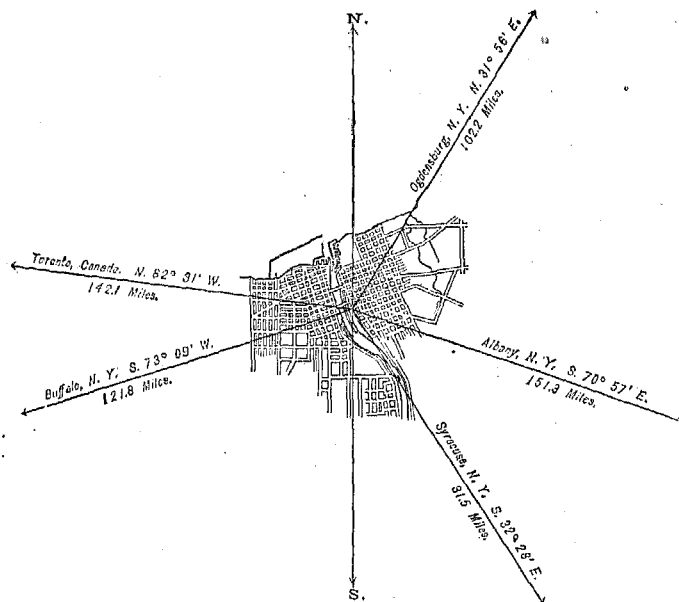
# OSWEGO,

## OSWEGO COUNTY, NEW YORK.

### POPULATION

IN THE  
AGGREGATE,  
1830-1880.

	Inhab.
1790.....	.....
1800.....	.....
1810.....	.....
1820.....	.....
1830.....	2,703
1840.....	4,665
1850.....	12,205
1860.....	16,816
1870.....	20,910
1880.....	21,116



### POPULATION

BY  
SEX, NATIVITY, AND RACE,  
AT  
CENSUS OF 1880.

Male.....	10,055
Female.....	11,061
Native.....	15,555
Foreign-born.....	5,561
White.....	20,983
Colored.....	*133

\* Including 3 Chinese and 13 Indians.

Latitude: 43° 28' North; Longitude: 76° 30' (west from Greenwich); Altitude: 0 to 165.15 feet. (a)

### FINANCIAL CONDITION:

Total Valuation: \$8,627,086; per capita: \$409 00. Net Indebtedness: \$1,264,224; per capita: \$59 87. Tax per \$100: \$3 44.

### HISTORICAL SKETCH.

In 1722 Governor Burnet erected here a trading-post for the purpose of securing the trade of the Indians. He built it upon the west side of the Onondaga river, and attracted a large Indian trade in furs and skins. In 1727 the place was strengthened against the French, who were jealous of the thrift of the post, by the erection of "a stone house of strength", or fort. Though the destruction of the fort was threatened by the French, no attack was made upon it. During this time Oswego was considered the most important military post in the colony of New York. Its support was very essential, and annual appropriations were made by the colonial assembly for the purpose.

a Above low water in lake Ontario, which is 244.85 feet above sea-level.



In 1753 began the old French war which disturbed the peace and security of Oswego especially. In 1755 the place was further strengthened by the building of two new forts—fort Ontario and Oswego New fort. The garrisons were continually annoyed and harassed by small parties of French and Indians, and occasional skirmishes took place. In the month of June, 1756, Montcalm started from fort Frontenac for the capture of Oswego. On the 6th of August he invested the place, and on the 14th, after a stubborn resistance, the place, under command of Colonel Mercer, capitulated. The French destroyed the forts and departed. In the month of August, 1758, Colonel Bradstreet arrived at Oswego with 3,340 men, *en route* against fort Frontenac, which he took, and returned in triumph to Oswego. He set about repairing the demolished works, and in the same year finished the fort at the great carrying-place. From this time to its abandonment in 1798, Oswego was occupied by the British, and again became one of their most important posts.

But little is known of the local history of Oswego for the ten years preceding the Revolution, but it was a strongly garrisoned English post, and so remained until after the war. General Washington, in February, 1783, planned its capture, but the party sent against it lost its way and was forced to relinquish the attempt. The English continued to hold Oswego until 1798. After its surrender the United States kept a small garrison in the fort until about 1803, when it was abandoned till the war of 1812.

In 1797 an act was passed directing the surveyor-general to lay out 100 acres on the west side of Oswego river into proper streets and house-lots, so as to form in the most convenient part a public square or market-place, the principal streets to be 100 feet wide and the cross-streets 60 feet wide. These lots were ordered to be sold, and the governor was authorized to reserve such of them as he might think proper for public purposes. By an act of the legislature the lands included in this survey were to be "called forever thereafter by the name of Oswego". West Oswego was laid out and surveyed by Benjamin Wright in 1797, and East Oswego by John Randall in 1814.

For several years previous to the war of 1812 the fortifications at Oswego had been suffered to go to decay. To enforce the embargo act of April 3, 1812, Captain Asa Wells, with one company of militia, was ordered to Oswego, and during the greater part of that year occupied what remained of fort Ontario. The following July more troops were sent here, but the works were not repaired, and as the time of enlistment of the militia expired, they returned home and the place was feebly garrisoned by new levies, who depended mainly upon the naval force on the lake for the safety of their charge.

Early in the spring of 1814, in anticipation of an attack on the place, Colonel Mitchell was dispatched by General Bowen from Sackett's Harbor with five companies of artillery, serving as infantry, with orders to occupy and defend the old fort at the mouth of the river so long as would be consistent with the more important duty of covering the naval supplies stored at the falls awaiting their use in the creation of a superior naval force on lake Ontario. On the 6th of May the British fleet, consisting of four ships, three brigs, and a number of gunboats, after a slight attack on the 5th, appeared off the harbor again and opened a brisk cannonade upon the weak fort. At about the middle of the day they landed three parties, who carried the fort by assault. The American forces succeeded in effecting a good retreat to the falls. This attack upon Oswego created great alarm throughout the country at the time, and the militia flocked there in great force, but arrived too late to render assistance, as the British, after making all the destruction of property in their power, retreated before daylight the next morning.

The alarms of war had now ceased upon the frontier, but it took several years for the villages along the lines to regain their wonted prosperity. A small grist-mill and a saw-mill were built at the falls of the Oswego river in 1809, and it is probable that small mills had been put in operation by the English, during their occupancy, about 1750. The salmon fisheries at the falls proved an important business; but since the erection of the state dam these fish have not visited the waters of the Oswego. With the construction of the Oswego canal in 1828 died the carrying business at the place; but a great impetus was given to it in a more extended and far-reaching way by this enterprise, and by the opening of the Welland canal in 1830, which completed the channel of water connection with the interior of New York state and all the ports of the great lakes as well as with the Atlantic ocean. From these dates until the panic of 1836-'37, Oswego grew and flourished in commerce, manufactures, and population.

In 1828 Oswego received a village charter. The great pier at Oswego was begun in 1827 and finished in 1830. It was built for and effects the purpose of affording protection to the harbor. The flouring business early became a large one here, the first mill, with five runs of stones, having been built in 1820. In 1848 Oswego was incorporated as a city. From 1844 to 1856 the place saw its most prosperous days, the reciprocity treaty with Canada greatly benefiting it. From the time of the panic of 1857, and through the civil war, Oswego's business was depressed, but was beginning to revive when came the panic of 1873. Her recovery from this is now going on rapidly, feeling as she does the effect of the country's prosperity.

## OSWEGO IN 1880.

The following statistical accounts, collected by the Census Office, indicate the present condition of Oswego:

## LOCATION.

Oswego lies in latitude  $43^{\circ} 28'$  north, longitude  $76^{\circ} 30'$  west from Greenwich, on a river of the same name, and is the only American city on lake Ontario. Its old harbor is formed by inclosing a part of the lake and river basin by a breakwater and piers. The depth at low water is from 9 to 13 feet, and there are 3 miles of wharfage. The new harbor is formed by a new breakwater projecting 1,100 feet north of the old breakwater into the lake, and inclosing about 100 acres. The depth of water is from 12 to 25 feet, and it has a shore-line of about 1 mile. Communication by water is open to all ports on the great lakes, all points on the Erie canal and Hudson river, and, by way of the Saint Lawrence river, with the ocean.

## RAILROAD COMMUNICATIONS.

Oswego is upon the following railroads: Delaware, Lackawanna, and Western, running to Scranton and the coal-fields of Pennsylvania; Lake Ontario and Western, running to New York; Rome, Watertown, and Ogdensburg, running to Rome and Ogdensburg; and the Lake Ontario Shore railroad, to Lewiston and Niagara Falls.

## TRIBUTARY COUNTRY.

The adjacent country with which the city has a local trade is agricultural, being devoted to dairying and the raising of stock, hay, oats, barley, and potatoes. Apples, pears, peaches, and strawberries are also raised largely.

## TOPOGRAPHY.

Oswego river, which divides the city into two nearly equal parts, is the direct outlet of seven large lakes in central New York, drains 3,000 square miles, and has a fall of 110 feet in the last 12 miles of its course. The south border of the city is skirted by a bluff about 160 feet above lake Ontario. Here begins a deep ravine excavated by the river through strata of red sandstone of the Medina group and underlying shale. The local rock along the lake-front is a hard, compact gray sandstone, which is very slightly affected by the elements. The river is bordered on each side by a ridge which rises by gradual slopes to a height of 100 feet. These ridges are about 1 mile apart, and end on the lake shore in bluffs from 40 to 60 feet high.

## CLIMATE.

Highest recorded summer temperature,  $100^{\circ}$ ; highest summer temperature in average years,  $95^{\circ}$ . Lowest recorded winter temperature,  $-14^{\circ}$ ; lowest winter temperature in average years,  $-5^{\circ}$ . The mean temperature for the three summer months is about  $68^{\circ}$ ; that of three coldest months, about  $23^{\circ}$ . February and March are particularly disagreeable months. There are no near marshes of magnitude. The prevailing winds are from the northwest, and, blowing over the great lake, help to give the city a delightfully mild and bracing climate for some eight months of the twelve.

## STREETS.

The total length of streets is 60 miles. These are paved with the following materials: 1 mile with cobble-stones, 1 mile with stone blocks, one-half mile with broken stone, 500 feet with wood, and 3 miles with gravel. The cost of each, per square yard, so far as could be ascertained, was, for cobble-stones, \$1 50; stone blocks, \$2; broken stone, \$1 50; and gravel, 75 cents. Broken stone and stone blocks are the most easily kept clean and the more permanently economical. Sidewalks are of pine planks and flag-stones. The gutters are paved with cobble- and flag-stones. Trees are planted in nearly all of the streets except the business ones, and many of the sidewalks have grassed borders. The paving of streets is done by contract, and repairs are done under the direction of the superintendent of public works. About \$17,000 is annually expended on streets and bridges. Experience in Oswego indicates a preference for contract work in the construction of streets. A steam stone-crusher is used with good effect. There are no horse-railroads or omnibus lines in the city.

## WATER-WORKS.

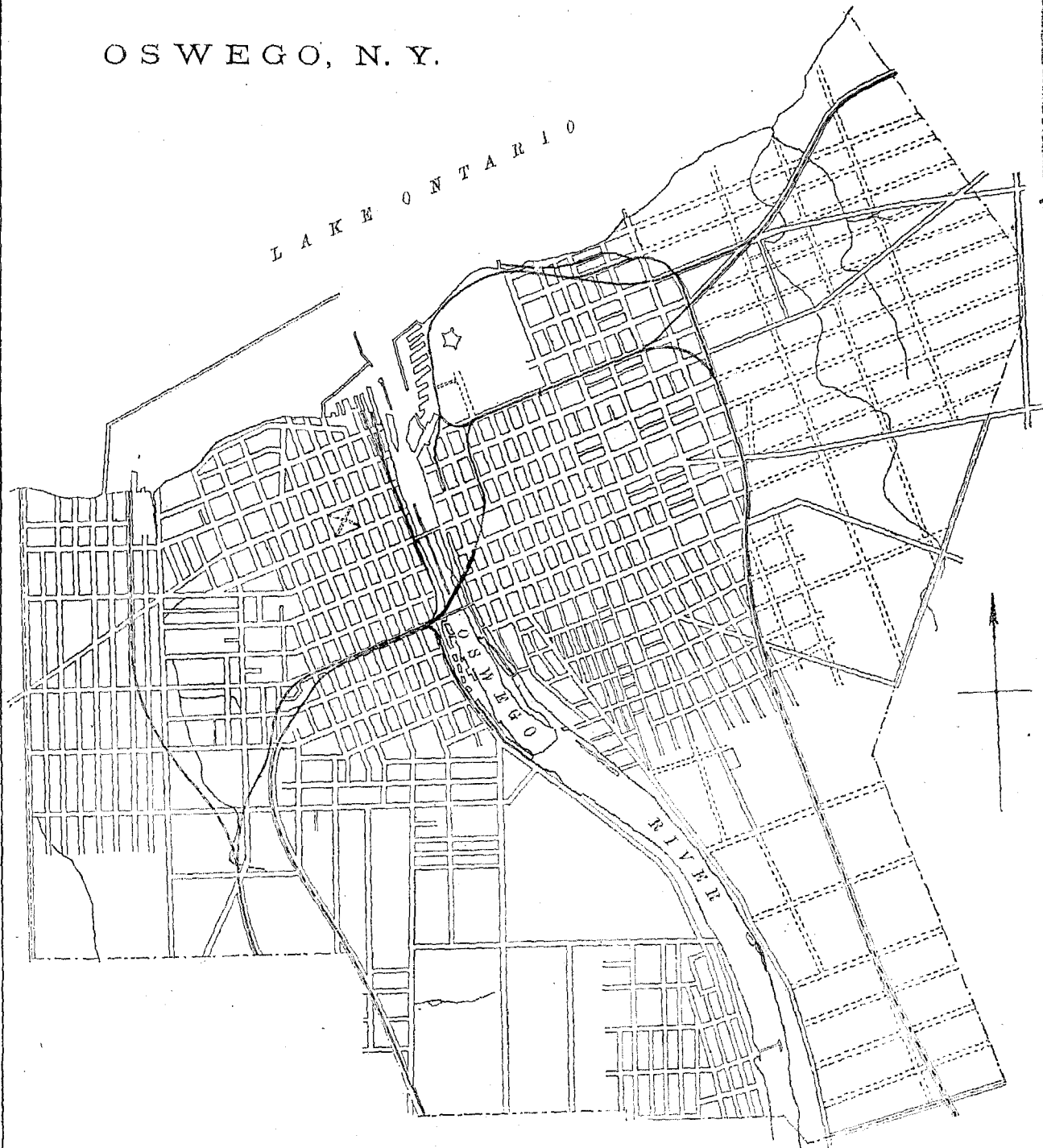
The water-works are owned by a private company. The water is taken from the Oswego river and pumped by water-power into 2 reservoirs, respectively 160 and 190 feet above the lake. The reservoirs have each a capacity of 7,500,000 gallons. The water is distributed through about 25 miles of pipe. The city pays annually for water for all purposes, including a supply for 17 public drinking-fountains and 162 hydrants, \$24,550.

## GAS.

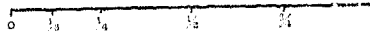
The gas works are owned by a private corporation. The charge per 1,000 feet is \$2 75. The city pays \$16 a year for each street-lamp, 384 in number.

# OSWEGO, N. Y.

L A K E O N T A R I O



SCALE OF MILES.



MBS ENG. CO., N. Y.

## PUBLIC BUILDINGS.

The following buildings are owned or occupied by the city for municipal purposes wholly or in part: City hall, engine-houses, school-houses, and jail. Their total cost is given at \$325,000. The city hall alone cost \$175,000. The jail, court-house, and county clerk's office are owned in common with the county. The cost of the city's portion is \$75,000.

## PUBLIC PARKS AND PLEASURE-GROUNDS.

Total area, 11.425 acres. The area of the larger parks is as follows:

	Feet.
Franklin square.....	396 by 500, not fenced.
Washington square.....	396 by 500, not fenced.
Highland park.....	100 by 234, fenced.
Hamilton park.....	100 by 234, unimproved.
Grove park.....	100 by 234, unimproved.
Montcalm park.....	396 by 154 by 16 (triangular).

The first five named were donated to the city. The cost of construction and repair and maintenance of parks is defrayed from the general highway fund, and no separate account is kept. No record is kept of the number of annual visitors of various kinds. The parks are controlled by the board of public works.

## PLACES OF AMUSEMENT.

Oswego has the following theaters, concert-halls, and lecture-rooms: Grant Block house, seating 500; Oswego Academy of Music, seating 950; Oswego Mansard hall, seating 800; Delaware, Lackawanna, and Western Railroad hall, seating 600; Richardson hall, seating 500; and Saint James' hall, seating 600. Theaters pay no license or other revenue to the city; all shows must procure a license. There are no concert- and beer-gardens.

## DRAINAGE.

A general plan for the sewerage of the city, prepared in 1869, was adopted in 1871. It is not closely adhered to, and is modified as each case comes up. The main or trunk sewers for which it provided have yet not been constructed.

Previously to 1854, stone drains were laid to meet individual necessities. At about that date several trunk-sewers were constructed, to be paid for by local assessment. Owing to technical flaws in the assessment it was vacated, and the cost was thrown upon the city. From 1863 to 1868 several cement-pipe sewers were constructed. The water-supply was introduced in 1868. The only provision for ventilation is by untrapped inlet-basins. The mouths of the sewers discharging into the mill-race, which flows to lake Ontario, are more or less exposed.

Concerning the removal of deposits, it is said that "after a sewer is once constructed but little attention is paid to it until complaint is made; then deposits are flushed out, breaks repaired, etc.". The cost of this work is not kept separately.

The city usually defrays one-third of the expense, and the remaining two-thirds is assessed upon the property more immediately benefited by the construction, which generally embraces the lots abutting the sewer, and such other lots as would naturally drain through the sewer constructed.

Assessment on abutters is "usually by the front foot, with an equalization or concession to corner lots; *i. e.*, they are not assessed for their full frontage, if their longest side abuts on the sewer. Laterals are usually assessed a less amount, proportioned to their distance from the sewer. During 1880 the city authorities constructed a public sewer in East Bridge street, some 1,532 feet in length, consisting of 24-inch cement oval pipe. The average excavation was 10 feet, half of the way was through rock, averaging 4 to 5 feet in depth, with the necessary inlet-wells, connections, etc., for the sum of \$2,922 99. The parties interested were some five years agitating the subject before the order to proceed with the work was secured. The following abstract shows the details:

	Cost.	Total cost.
24-inch pipe (5-foot excavation), 52 linear feet.....per foot..	\$1 50	\$78 00
24-inch pipe (10-foot excavation), 1,480 linear feet.....do....	1 77	2, 619 60
12-inch pipe, connecting, 10 linear feet.....do....	62	6 20
10-inch pipe for inlet-wells, 146 linear feet.....do....	44	64 24
One 24-inch inlet-well, 3 feet deep.....each....	15 00	15 00
Four 24-inch inlet-wells, 6 feet deep.....do....	19 50	78 00
Three 24-inch manholes.....do....	10 00	30 00
One 10-inch lamp-hole.....do....	2 50	2 50
Five 15-inch connection branches.....do....	1 00	5 00
Three 12-inch connection branches.....do....	75	2 25
Thirteen 13-inch connection branches.....do....	60	7 80
Thirty-six 8-inch connection branches (house.).....do....	40	14 40
Total.....		<u>2, 922 99</u>

Owing to unexpected rock excavation, for which no allowance was made, the contractor lost about \$500.

N. J. Harris, esq., civil engineer, city surveyor, closes his report as follows:

The city is located on lake Ontario, at the mouth of the Oswego river, and the built-up portion extends about  $1\frac{1}{2}$  miles along said river, which flows northerly into lake Ontario. Its surface consists of moderately steep hills—highest point 170 feet above the lake—sloping towards the river, towards the lake, and, on the sides of the hills opposite the river-side, towards creeks which flow northerly, discharging into lake Ontario about 1 mile from the mouth of the river.

At the lake outlet of the creeks is a low level plain, underlaid with gray sandstone rock, at a depth of from 4 to 6 feet below the surface. Along the lowlands expensive trunk-sewers have been projected, according to the sewerage plan adopted in 1871, but not yet built. Their cross-section is 4 by 6 feet.

As a general thing, the river-slopes of the hills have been fairly sewered, but on the opposite slopes those who have drains have been content with draining into the street-gutters. And since the introduction of water-works in 1868, and the subsequent increased discharge from water-closets and drains, the condition of the lands adjacent to the creeks, and of the lands which depend upon drainage in that direction, has been quite a serious matter, and all sewers projected in that direction encounter quite a fierce opposition. A clause in the city charter provides: "That in case the expense of making any local improvement \* \* \* shall exceed \$3,000, \* \* \* the order directing said improvement shall be rescinded, unless a majority of those persons whose names appear upon the assessment roll shall have petitioned for or have signified their assent in writing for the making of said improvements."

As it is generally impracticable to obtain their consent, the sanitary condition of a portion of the city is becoming deplorable, as the filling of yards with cesspools and privy-vaults is becoming quite common.

#### CEMETERIES.

Connected with the city there are 9 public and private cemeteries and burying-grounds (including 3 where interments are no longer permitted):

*Riverside Cemetery.*—Area, 126 acres; one-half mile south of the city limits (principal cemetery).

*Saint Paul's Cemetery.*—Area, 18 acres.

*Saint Peter's Cemetery.*—Area, 10 acres.

*Rural Cemetery.*—Area, 8 acres; 3 miles south of the city line in Oswego town.

*Union Village Cemetery.*—Adjacent to Rural cemetery.

*Irish Settlement Cemetery.*—In the town of Oswego.

*Second Ward Cemetery.*—Area,  $4\frac{1}{2}$  acres.

*Fort Ontario Reservation Cemetery.*—Area, 34,375 square feet.

*Fifth Ward Cemetery.*—Area,  $4\frac{1}{2}$  acres.

The total number of interments in four of the cemeteries is as follows: Saint Peter's cemetery, 32; Riverside cemetery, 2,082; Rural cemetery, 1,466; and Union Village cemetery, 557. Permits are not generally obtained for interments, except from the authorities of the cemeteries. The practice is to keep bodies not more than three days after death. The depth required for graves is from  $3\frac{1}{2}$  feet for children to 6 feet or more for adults.

In Saint Peter's cemetery the charges are, for lots 11 feet least width, 10 cents per square foot. For interments under twelve years of age, \$1 50; over twelve, \$2. In the Riverside cemetery the charges are, for lots 16 feet square, \$30. For interments under twelve years of age, \$2; over twelve, \$3. In the Rural cemetery the charges are, for a single grave on public lots appropriated for that purpose, for a person under twelve years of age, \$2; over twelve, \$3. For disinterments of persons under twelve years, \$4; over 12 years, \$7.

#### MARKETS.

There are no public or corporation markets in Oswego. Certain streets, however, are designated for the exhibition and sale of farm produce at (in effect) any and all hours—though by ordinance all sales must be made before 12 m. No licenses are required, and the city derives no revenue from the sales. These spaces are in East First street, aggregating 400 feet on the sides of the street, and in East Second street, aggregating the same length.

#### SANITARY AUTHORITY—BOARD OF HEALTH.

The title of the chief health organization is "the board of health". It is not an independent body, but is the board of public works acting as a board of health. The board consists of four members, appointed by the mayor and common council. The bills are audited by the town board of audit. The annual expense of the board when there is no declared epidemic is \$450, expended for salaries of clerk, \$100, health physician, \$150, and two nuisance-abaters, \$200. The board is not limited in the amount of expense it may incur during an epidemic. In the absence of epidemics it has authority to keep the sanitary condition of the city good and healthful. During epidemics it may, and is bound to, prevent the spread of the disease or its importation by any means, including quarantine, removal to pest-house, the destruction of articles suspected of infection, abatement of nuisances, vaccination, etc. The two nuisance-abaters are the executive officers of the board. Their salaries are \$100 each per annum, and their duties are to carry out the orders of the board in examining, reporting, and abating nuisances. Besides the two abaters there are no assistant health officers or inspectors employed. Neither of the abaters is a physician, nor have they police power; but they can enter premises and houses. The board

transacts its business by meeting, hearing complaints, and ordering action upon them. It meets once a week in summer, and upon call at other times. Inspections are made only as nuisances are reported. When nuisances are reported the board orders the nuisance-abaters to examine and report to them. If necessary, they are ordered to abate the same, and the expense thereof is reported to the common council, which orders the amount assessed upon the property. Concerning defective house-drainage, privy-vaults, cesspools, and sources of drinking-water, inspections are made only upon complaint. The same is true of defective sewerage, street-cleaning, etc. The board exercises no control over the conservation and removal of garbage, and makes no regulations for the burial of the dead. There are special regulations against the pollution, or filling up with ashes, earth, etc., of streams, harbors, and canal-slips.

#### INFECTIOUS DISEASES.

Small-pox patients are quarantined at their homes, watches are provided, the houses are disinfected, and the necessary destruction of bedding and clothing is attended to. There are no regulations requiring the isolation of scarlet-fever patients. For the protection of schools, children, either infected themselves or from infected families, are not allowed to attend school. Vaccination is compulsory, and is done at the public expense.

There is no system of registration of diseases, births, and deaths.

#### MUNICIPAL CLEANSING.

*Street-cleaning.*—Streets are cleaned by the city with its own force and by hand. In business streets this cleaning is done once a week, "in other streets semi-occasionally, when complaint is made". It is efficiently done at an expense which can not be stated, as it is not separated from other street work. The sweepings are dumped in the most convenient place.

*Removal of garbage and ashes.*—Garbage is removed by swill-gatherers. The regulations as to its conservancy while awaiting removal are "strict but not enforced". Garbage and ashes may be kept in the same vessel. The final disposition of garbage is for feed. Ashes are finally dumped into the street, and sometimes drawn away. The cost of this work is not given.

*Dead animals.*—The carcass of any animal dying within the limits of the city is buried by the nuisance-abaters. The cost of this service during the past year was about \$40. No record was kept of the number of animals removed and buried.

*Liquid household wastes.*—Chamber slops are disposed of in the same way as laundry wastes and kitchen slops. Most of the liquid household wastes of the city deliver into cesspools, but some go into street-gutters and some into the sewers. The cesspools are cheaply built, and are "considered more or less valuable according to their leaching qualities". Some of them are provided with overflows, delivering "sometimes into a street-gutter or upon a neighbor's lot". Concerning cases where household wastes are run into street-gutters, City Surveyor N. J. Harris writes: "The board of health covers the offensive deposit with lime; sometimes compels the abutters to cover the gutters; sometimes the ends of the drains are plugged up for a couple of weeks, then opened and allowed to run until complaint is made." When dry wells or cesspools are used, they do not usually receive the waste of water-closets.

*Human excreta.*—About 15 per cent. of the houses of the city have water-closets; the balance depend on privy-vaults. About nine-tenths of the water-closets deliver into the public sewers, but very few into cesspools. None of the privy-vaults are even nominally water-tight. The regulations regarding the construction and emptying of privy-vaults require them to be made at least 6 feet deep, and their contents to be removed only between the hours of 11 o'clock at night and 4 o'clock in the morning; but practice is more loose. The dry-earth system is but little used. The ultimate disposal of the night-soil is by burying in the ground.

*Manufacturing wastes.*—These are, in practice, got rid of in the manner most convenient.

#### POLICE.

The police force is appointed by the board of police commissioners. The chief executive officer is the chief of police. He has power to entertain complaints, to issue warrants, and to commit for trial or examination. His salary is \$900 a year. The rest of the force consists of a captain, at a salary of \$780 per year, and such number of patrolmen as the commissioners may appoint at an annual salary each of \$660. The uniform is of navy-blue cloth—coat, vest, and trousers, with an overcoat in winter, and blue-flannel coat and trousers in summer. The men furnish their own uniforms at an annual cost of \$50 each. Patrolmen are equipped with belt, club, and shield. Their hours of service are 12, and they patrol 10 miles of streets.

The total number of arrests during the past year was 781, the principal causes for which being burglary, larceny, intoxication, and violation of the city ordinances. Their final disposition was: Tried and committed, 621; tried and acquitted, 68; examined and held, 50; and examined and discharged, 42. Property to the value of about \$400 was reported to the police during the year as lost or stolen, of which about half was recovered and returned to the

owners. The number of station-house lodgers for the year was 125, as against 111 in 1879. Free meals to the value of \$35 were furnished to the station-house lodgers. The force is required to co-operate with the fire department by sounding fire-alarms and preserving order and protecting property at fires; with the health department in obeying the orders of the board of health by suppressing and abating diseases and nuisances. Special policemen are appointed by the police commissioners, on the request and at the expense of individuals and corporations, to protect private property. They are under direction of the chief of police, and have the same powers at the localities named in their warrants as regular policemen. The yearly cost of the police force (1880) is \$11,000.

## FIRE DEPARTMENT.

The following, which is taken from the first report of the board of fire commissioners of the city of Oswego, for the year ending February 21, 1878, is all that could be learned regarding the fire department:

The force consists of 3 engine companies and 1 hook-and-ladder company. The apparatus comprises 3 steam fire-engines, 4 horse hose-carriages, 2 hand hose carts, 2 hook-and ladder trucks, 7 Babcock fire-extinguishers, and about 5,000 feet of hose.

## MANUFACTURES.

The following is a summary of the statistics of the manufactures of Oswego, New York, for 1880, being taken from tables prepared for the Tenth Census by A. E. Buell, special agent:

Mechanical and manufacturing industries.	No. of establishments.	Capital.	AVERAGE NUMBER OF HANDS EMPLOYED.			Total amount paid in wages during the year.	Value of materials.	Value of products.
			Males above 16 years.	Females above 15 years.	Children and youths.			
All industries .....	179	\$2, 611, 238	1, 754	272	106	\$756, 435	\$3, 646, 845	\$5, 610, 944
Blacksmithing (see also Wheelwrighting) .....	11	3, 120	10	.....	.....	2, 782	4, 275	14, 850
Boots and shoes, including custom work and repairing .....	16	13, 750	25	.....	.....	9, 576	21, 556	45, 983
Bread and other bakery products .....	7	42, 200	23	4	.....	10, 021	49, 651	74, 746
Carpentering .....	11	21, 100	61	.....	1	21, 960	26, 323	55, 575
Cooperage .....	12	24, 250	47	.....	6	12, 637	44, 595	66, 010
Flouring- and grist-mill products .....	5	465, 000	74	.....	.....	37, 102	1, 136, 974	1, 591, 759
Foundry and machine-shop products .....	5	416, 818	363	.....	2	153, 904	258, 311	552, 780
Furniture .....	4	19, 500	19	1	.....	8, 902	17, 100	37, 000
Liquors, malt .....	3	68, 000	12	.....	1	6, 146	30, 970	55, 125
Lumber, planed .....	4	160, 500	111	.....	.....	47, 300	163, 605	238, 932
Marble and stone work .....	4	11, 500	7	.....	.....	1, 875	3, 585	11, 399
Painting and paperhanging .....	6	20, 300	38	.....	2	13, 264	20, 000	42, 350
Photographing .....	3	10, 150	5	1	.....	1, 732	3, 290	7, 857
Plumbing and gasfitting .....	3	12, 000	17	.....	.....	10, 100	33, 240	55, 054
Printing and publishing .....	3	110, 000	70	.....	14	27, 956	15, 461	66, 580
Saddlery and harness .....	4	4, 800	8	.....	.....	2, 950	6, 600	12, 200
Shipbuilding .....	7	27, 500	58	.....	.....	23, 072	22, 030	50, 563
Tinware, copperware, and sheet-iron ware .....	15	19, 300	34	.....	.....	15, 394	27, 700	63, 950
Wheelwrighting (see also Blacksmithing) .....	5	8, 600	13	.....	.....	5, 405	5, 400	14, 900
All other industries (a) .....	51	1, 152, 850	760	206	80	344, 357	1, 756, 239	2, 562, 331

a Embracing baking and yeast powders; baskets, rattan and willow ware; boxes, cigar; boxes, fancy and paper; carriages and wagons; cement; coffins, burial cases, and undertakers' goods; confectionery; cutlery and edge tools; drain and sewer pipe; drugs and chemicals; dyeing and cleaning; gloves and mittens; hats and caps; hosiery and knit goods; instruments, professional and scientific; iron railing, wrought; leather, curried; leather, tanned; lime; lock- and gunsmithing; looking-glass and picture frames; lumber, sawed; malt; mineral and soda waters; mixed textiles; patent medicines and compounds; pumps; sash, doors, and blinds; shirts; soap and candles; sporting goods; starch; tobacco, cigars and cigarettes; upholstering; watch and clock repairing; window blinds and shades; and wood, turned and carved.

From the foregoing table it appears that the average capital of all establishments is \$14,587 92; that the average wages of all hands employed is \$354 80 per annum; that the average outlay in wages, in materials, and in interest (at 6 per cent.) on capital employed is \$25,474 61.



# MIDDLE STATES: OSWEGO, N. Y.

609

## COMMERCE AND NAVIGATION.

[From the reports of the Bureau of Statistics for the fiscal years ending June 30.]

Customs district of Oswego, New York.	1879.	1880.
Total value of imports.....	\$5, 173, 380	\$5, 403, 710
Total value of exports:		
Domestic.....	\$944, 963	\$897, 241
Foreign.....	\$137, 010	\$100, 631
Total number of immigrants.....	81	98

Customs district of Oswego, New York.	1879.		1880.	
	Number.	Tons.	Number.	Tons.
Vessels in foreign trade:				
Entered.....	1, 775	289, 631	2, 264	374, 210
Cleared.....	1, 770	288, 636	2, 256	370, 088
Vessels in coast trade and fisheries:				
Entered.....	527	92, 451	411	80, 030
Cleared.....	526	90, 365	465	72, 584
Vessels registered, enrolled, and licensed in district..	129	22, 604	130	22, 219
Vessels built during the year.....	27	673	4	724

*a* Includes 5 canal-boats.